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# EKISTICS

ABSTRACTS ON THE PROBLEMS AND SCIENCE OF HUMAN SETTLEMENTS

# ΟΙΚΙΣΤΙΚΗ

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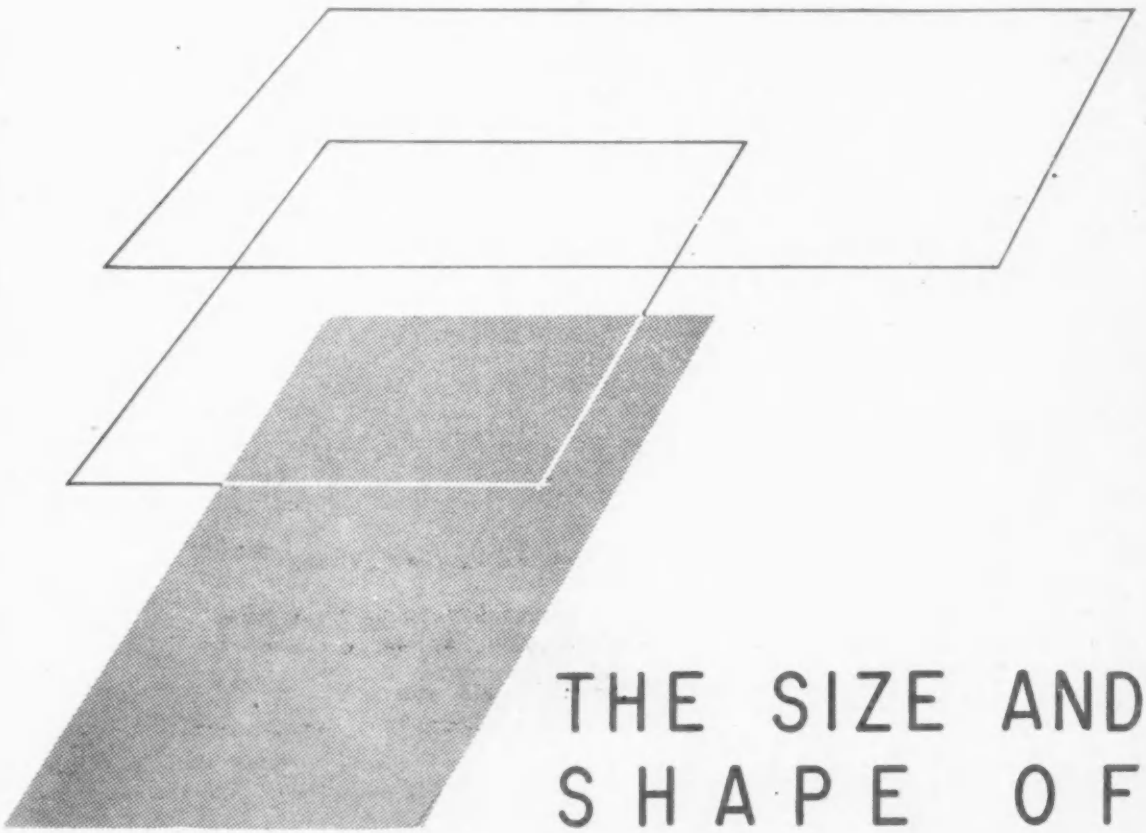

# THE SIZE AND SHAPE OF URBAN PLOTS

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# E K I S T I C S

## ABSTRACTS

of

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Consulting Engineers
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EKISTICS is compiled by Mrs. Gwen Bell under the direction of Prof. J. Tyrwhitt.

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## EDITORIAL

### NEW TOWNS -- IN THEORY AND IN PRACTICE

The first four articles, which occupy much of this month's EKISTICS all deal with the problem of the design of new towns. G. R. Collins has provided a careful analysis of the progress of the Linear City idea since its inception in Spain in 1882 and D. Tomlinson discusses the "landscape city," following out an ever-increasing interest in the penetration of greenery into urban design, whether "linear cities" or "concentric garden cities." Brief descriptions follow of two new towns: Imatra in Finland and Bagnols-sur-Céze in France. Both derive much from the three notions: the "linear city" based on efficient transportation facilities; the "concentric garden city" based on self-containment; the "landscape city" based on the incorporation of nature.

Perhaps it should be stated here that the theory of the linear city has never had any relation to what later came to be called "ribbon development." The linear city, from its birth, was conceived as a series of units of residential development, strung along one side of a main artery; all of the houses facing directly onto side roads away from the highway. Although, in the earliest designs, a parallel string of developments was shown on the opposite side of the highway, no cross connections were intended. Indeed a railway ran down the center of the highway strip. "Ribbon development" essentially consists of a single row of dwellings bordering a major highway. Tony Garnier's "Cite Industrielle" (see illustration page 247) was a true linear city, despite the doubts expressed by Mr. Collins. Only Garnier--far in advance of his time--restricted the entries to and from his major highway to two.

The existence of an efficient system of transportation is the single absolute essential for the success of a linear city. It was the advent of the "street railway" which inspired its inventor, Soria y Mata. This is the reason for the failures of attempts to establish linear cities in the USSR. In the absence of efficient transportation systems, such a design obviously puts an excessive strain upon all communication.

The concentric garden city, brain child of Ebenezer Howard, had for more than two generations served as a pattern of escape for all those designers who have fought shy of striving to find a way to humanize a mechanized society. LeCorbusier stands out as one of the few fearless spirits who have never succumbed to its charms. The small, inward-looking, self-contained town--complete with its own small industries and centers of culture--is the result of a romantic dream of reversal to an idyllic

mediaevalism. This started as a reaction against the horrors of the nineteenth century industrial cities of Britain (Blake's "black Satanic mills") as well as the horrors of the ever increasing sprawl of London (Cobbet's "great wen"). Ebenezer Howard produced a seemingly practical design which embodied the idealism of the more romantic painters and poets of the period (the "pre-raphaelites" and, in especially, William Morris), all of whom wished to escape from the ugly realities of their period to a pre-industrial dream world of small towns and village handicrafts.

Although, among the new towns actually built, there have been many more attempts to reproduce the romantic "Anglo-Saxon" concentric garden city than the logical "Latin linear"city, there can be no doubt in which direction the future lies.

Both the examples of new towns, which follow the first two articles, are relatively small and isolated cities. Thus, both are necessarily more self-contained than the great majority of residential developments, which tend to be related to existing major centers. Both of these new towns, despite differences in topography and climate, incorporate the landscape into their designs. Both are bold statements. Bagnols-sur-Céze has had to face the particularly difficult problem of grafting a new city (with new inhabitants) upon an old, traditional city, which has remained static for several generations. The solution adopted seems sound in principle: to make no attempt to compromise the architecture of the new city; to make every effort of wrecking the old city (aesthetically as well as functionally); and to provide a new center, between the two which can serve as a common meeting ground. Two doubts can be raised; whether this new center should not have been built from the start, and whether a sports center is the best form of common meeting ground.

## MODULAR CONSTRUCTION AND STANDARDIZATION

Two areas of research which tend directly to improve the level of living are modular construction and standardization. W. Holzbauer presents some interesting layouts of modularly designed, but differentiated residential areas. These profit from mechanization while providing varied quarters for different kinds of family groupings and different needs.

Standardization of products is proceeding in many countries as another beneficial result of mechanization. This month EKISTICS presents a short summary of the progress which is being made in this field in India.

## THE EXPANDING POPULATION

The demographic studies needed in the Caribbean for attacking over-population present an example of the kinds of studies needed in many parts of the world. But, besides the general problem of expanding populations, there are many specific problems which need to be tackled. In this issue EKISTICS abstracts from a report on the problem of refugees as well as one of the research and analysis necessary for planning educational programs. Here the main point made, apart from the urgency of the task, is the value and ease by which estimates can be made for the next ten years.

Community development programs are closely associated with population problems, especially in the growth of cities. A report of the first workshop in community development organized in Africa brings out the role of such programs and the contribution they can make in developing a social climated attuned to city planning.

## REGIONAL STUDIES

Some general knowledge of a country is an essential background for ekistics studies. This issue therefore includes a review of Bolivia and a study of "Israel, the Man-made Landscape" will follow in a succeeding number.

## THE SIZE AND SHAPES OF URBAN PLOTS (DOXIADIS ASSOCIATES)

This month the results are presented of a careful analysis of the effects of changes in size and shape of urban plots upon the total costs of urban development, taking into account long term as well as immediate costs. Though the study was made specifically for hot, dry climates, the conclusions that nothing is gained by wide frontages is of general application, provided this is accompanied by a strict control over orientation and building design.

Collins, George R.
LINEAR PLANNING THROUGHOUT THE WORLD
Journal of the Society of Architectural Historians, October 1959, Volume XVIII, No. 3. Pages 74-93. Illustrations.
711.41 (100)

1. George R. Collins was aided in the preparation of this article by a travel grant from the Columbia University Council during 1958. EKISTICS is presenting only a brief portion of his long and well-documented work which points out both the evolution of the linear city ideas and the inter-action of the personalities who developed them.

2. The theory of linear planning of cities, as developed in the late nineteenth century by Don Arturo Soria y Mata and his associates in Madrid, was received for the most part with condescension abroad. This seems incongruous since several modern urbanists have been adopting linear arrangements of cities along transportation routes. Arturo Soria's theory of planning and his pilot project, the Ciudad Lineal of Madrid, became known abroad in a number of ways.

3. The Linear City and the Garden City. A major link of the Madrid group with urbanism abroad came about through the relationship of the Ciudad Lineal with the international Garden City movement. It is obvious that the two theories have much in common with regard to fresh air, sunshine, vegetation, and the intermingling of urban and rural life. In their writings, both Arturo Soria and Ebenezer Howard railed against the same malignities of city congestion. There are, however, certain striking differences in premise. The Garden City proceeded on the assumption that urban congestion could be drained off by means of a pattern of isolated, self-sufficient statellite towns of limited size, judiciously situated, in the midst of farmland, at some distance from old city centers. Transportation routes would serve only as connectors amongst these offshoots of a former city and various devices would be employed to remove daily existence from contact with highspeed routes and to bring home and factory (or office) within easy walking distance of each other. The Ciudad Lineal envisioned the modern city as an endlessly continuous organism based directly upon the transportation arteries of the region, but also with its domestic life well insulated from traffic. Although the Garden City movement leaves itself open to the criticism of romantic escapism and of failure to exploit the advantages of modern metropolitan culture or of modern highspeed transportation, designers have generally been inclined to favor it in comparison. Soria's theory has usually been charged with, or confused with, the sin of 'ribbon' development and with too radical decentralization.

4. The periodical "La Ciudad Lineal" began to carry a standard feature of a systematic comparison of the two theories beginning in 1913. It generally contained the following arguments:

1. Envelope bearing cross section of a linear city recently received from Georges Benoit-Lévy.

- That the designation 'garden city' is itself amorphous and relatively meaningless as regards the actual form of any particular settlement, whereas the term 'linear city' stands for a clear-cut structural type, constant at all times and perfect for the whole surface of the earth. The garden city is thus a provisional and imperfect form for special small tracts of land.

-That garden cities do not take adequate account of transportation lines, whereas linear cities make locomotion the first consideration. Garden cities are less efficient than linear cities with regard to daily commuting time, and their winding streets lead to greater cost of upkeep than do the straight-line forms employed throughout linear cities.

-That garden cities perpetuate the old concentric pattern of land values, whereas in linear cities there is a more rational fall-off of values from the axial highway.

-That in the linear city, the comforts and refinements of urban civilization are more closely combined with country life than in garden cities.

-That the linear city has suffered abroad from the prejudice of its being a Spanish idea, and at home from the lack of civic unity among Spaniards (1).

However, on the whole, the relationship between the linear city group and Garden City movement seems to have been an amiable one with a frequent inter-change of ideas.

5. The Linear City in Chile. Outside of Spain the theory of the Ciudad Lineal was most enthusiastically expounded and came closest to fruition in the Republic of Chile. Here interest was occasioned largely, although not exclusively, through the efforts of a public-spirited engineer, Carlos Carvajal Miranda. Following an early career as a military engineer, Carvajal had been appointed about 1906 as Inspector General of Architecture in the Chilean Department of Public Works. In this capacity he was faced with the overwhelming task of overseeing the reconstruction of government buildings and inexpensive workers' housing following the earthquake of 1906. He chanced on some copies of "La Ciudad Lineal" and wrote Arturo Soria for technical advice.

6. Owing to his position in the government, Carvajal was increasingly drawn into the housing and city-planning activities of his country, and was fascinated by the possibilities of linear planning for rural and industrial workers' settlements. He became a staunch supporter of the Ciudad Lineal and raised official support for a ten-kilometer linear development of farm holdings to run from what was then the Western edge of Santiago to Los Bãnos de Apoquindo, through what is now the fashionable Santiago suburb of El Golf. The land was ceded and, despite some troubles over the streetcar franchise, the working capital was being negotiated in Belgium when President Pedro Montt of Chile, who had been supporting the project, suddenly died and the project was put in suspension.

SEÑOR CARLOS CARVAJAL
(Inspector General de Arquitectura)
Santiago será, con líneas ideales
la capital digna de una gran nación,
si los congresales
adoptan su plano de transformación.

2. Cartoon from the Chilean magazine *Zig Zag* of 1912 illustrating Carvajal's plan for the transformation of Santiago (courtesy of *Zig-Zag*).

7. Meanwhile, Carvajal gave official encouragement to, and eventually took part in, a Society for Inexpensive Housing for Employees which attempted to lay out another model settlement which never materialized. In addition, he was drawn into a further phase of Chilean planning. In that country planners concerned themselves with two general problems:

(1) workers' housing, urban and rural, both of which are inadequate today despite Chile's famous social legislations; and

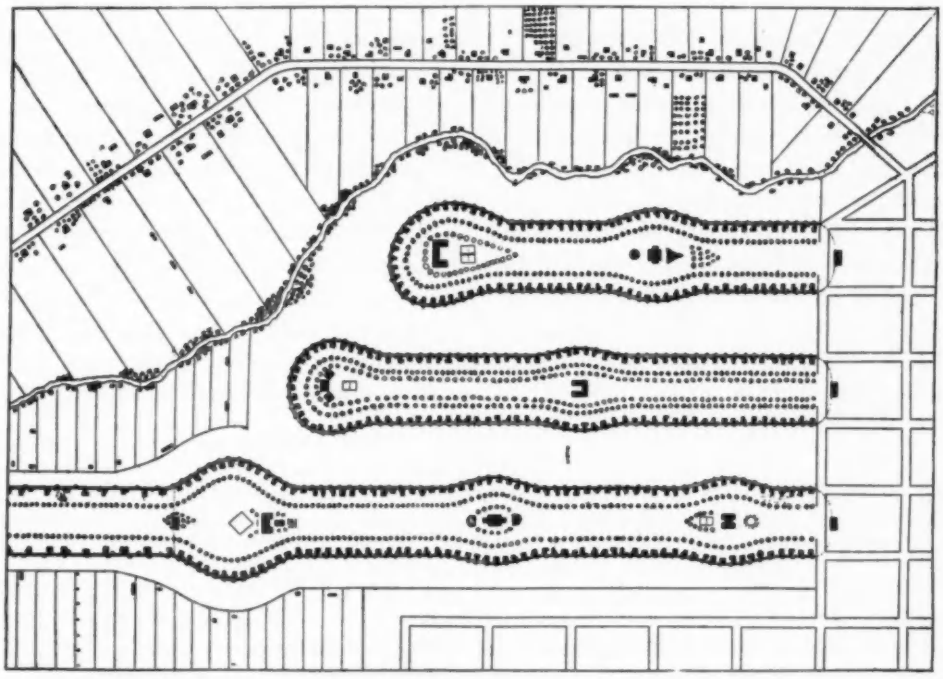
(2) the beautification, modernization, and controlled expansion of Chile's urban centers, especially Santiago.

In 1911 a committee of the Congress of Chile drew up a plan for Santiago which Carvajal, then an official, opposed as too timid. With the support of the Chilean Society of Architects, he drew up an alternative plan (Fig. 2) which set off several years' public controversy on the entire question. His suggestions were hardly radical. The main features of the plan were the widening of existing streets, the introduction of diagonals to cut through Santiago's colonial grid pattern, and the layout of an avenue--in general a Haussamannization of the city. This was never effectuated.

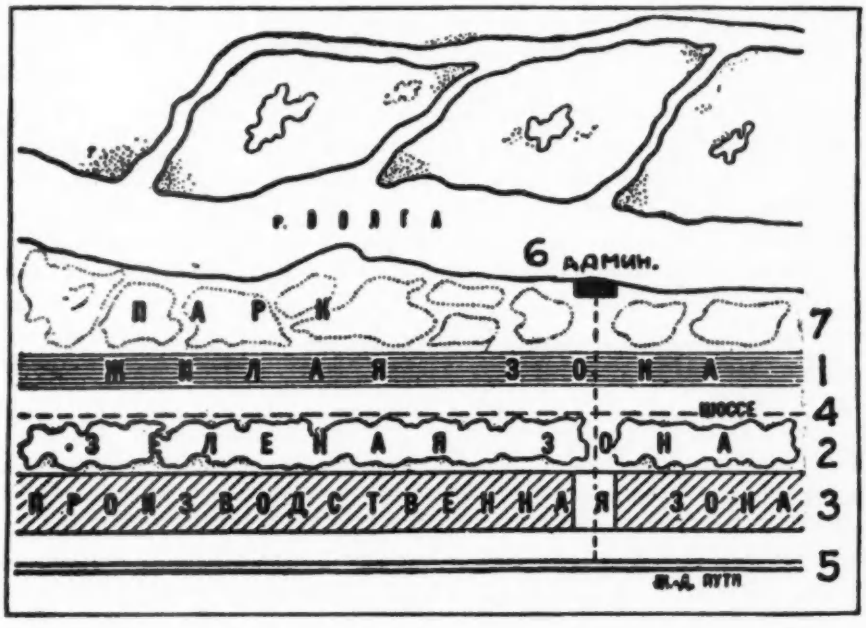
8. In the 1920's, Carvajal urged the use of linear planning for the agricultural colonies in Chile, and on three occasions he almost succeeded in establishing actual linear settlements in Chile. On the whole, Chile showed interest in linear planning more for the settlement and exploitation of rural areas than as the means of industrial expansion as it came to be employed in the twentieth century.

9. Milo Hastings' Linear Residential Arrangement. A somewhat linear project called 'A Solution of the Housing Problem in the United States' by Milo Hastings won a prize from the American Institute of Architects. It was his idea that houses should be arranged in a garden setting, but not according to the English Garden City. He would string his detached dwellings along the inside of long U-shaped road-loops which penetrated the countryside to great distances (Fig. 3). These houses would face on the common park that filled the interior of the loops and contained certain communal buildings. Tied in with the single street behind the houses would be, underground, the service pipes, cables, central heating ducts, and even vacuum pipes for house cleaning! It should be noted that this connector street was only a service street and not a thoroughfare. The loops were to be attached to highways at their open ends, forming neighborhood groups branching off from the arteries.

10. Arthur Comey's Linear Regional Plan. Another American linear layout is the ambitious one proposed in 1923 by Arthur Comey, in his article, 'Regional Planning Theory: A Reply to the British Challenge.' The 'British Challenge' was that of the Garden City, which Comey felt had been able to thrive only under hothouse



3. Plan of Milo Hastings' 'Solution to the Housing Problem', 1909–1919 (from *Journal of A.I.A.* VII, 1919).



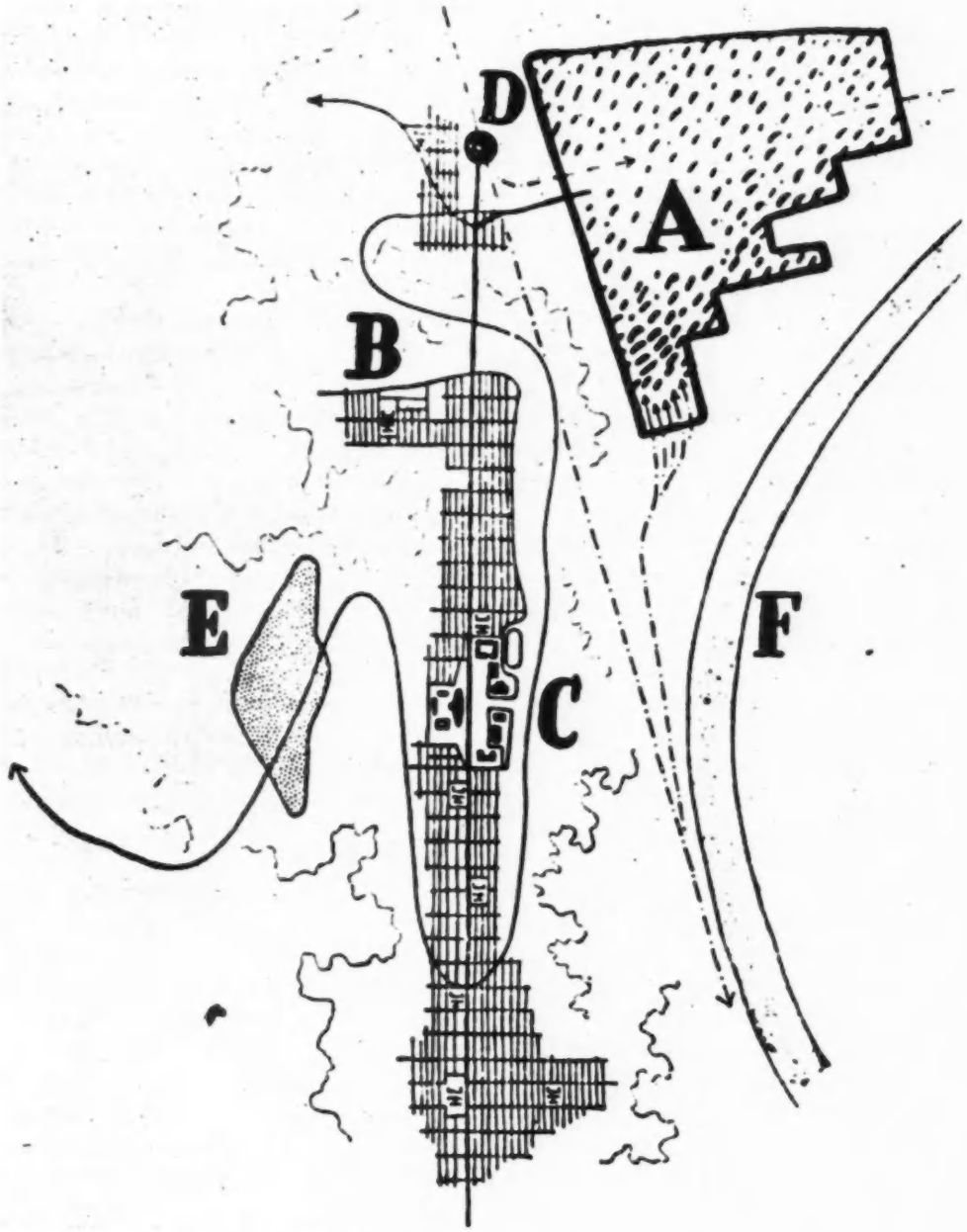

4. Miliutin's plan for linear Stalingrad, about 1931 (from Adams, *Residential Areas*).

cultivation, because it did not take into account the tremendous vigor of the metropolis in our century and because Garden City units could not easily be held down to their optimum population. He proposed a national plan based on a regularly formed net of highways meeting, not at right angles, but at 60° so as to leave vast hexagonal and triangular openings of countryside. At intervals along the crisscrossing highways, industrial and commercial linear cities would be developed always in close contact with the farmland appearing in the interstices. Periodically along the populated highways would be community centers, always governed in their plan by his basic triangular module. Comey undoubtedly knew of Soria's triangulation theory for regional planning but the all-encompassing, geometric web character of the American's plan, together with such ideas as the division of highways into low- and high-speed arteries have much more in common with LeCorbusier's type of technological theorizing.

11. Linear Planning in the Soviet Union. A most decisive development in linear theory took place at the hands of the architects of the Soviet Union's first Five-Year Plan (1928-1933). Professor N. A. Miliutin proposed the establishment of linear cities of a maximum size of 100,000 to 200,000 systematically arranged in such a fashion as to break down the distinction between the rural and urban proletariat. This was adopted as a working policy for a while, and a quantity of Soviet settlements were laid out along transportation arteries in a linear fashion.

12. Miliutin's theory is clear from his diagrammatic layout for an element of the city of Stalingrad (Fig. 4). His theory insisted upon a rigid order of parallel strips of industry, transportation, and residence, separated by buffer zones of vegetation. First came the railway (5), then the industrial zone (3), then a verdured zone at least 500 meters wide (2) to separate the factories from the next zone, the residential and to contain the arterial highway (4). In the residential zone (1) would be built the schools and most of the public buildings, and it would be followed by a recreation park (7) separating it from the rural countryside. In theory, industrial workers and agricultural workers were to live in the same collective homes and attend the same technical schools in the residential strip (1). The distinctive contribution of Miliutin would seem to be his systematic, in fact rigid, parallelism of zones and his employment of bands of vegetation to insulate residences from the bustle of industry and heavy transport.

13. Tony Garnier's Industrial Utopia. Although these Soviet linearists were probably aware of Madrid's Ciudad Lineal and may have known of its later variations, they owed more, probably, to a project by a Frenchman Tony Garnier. Garnier, a pioneer designer of the industrial utopia, had exhibited in Paris (1901-1904) the project for a cité industrielle which was remarkable for its severely rectangular buildings of reinforced concrete and for its close study of the relationship between the industrial area, residential area, and arteries of transportation (Fig. 5). His

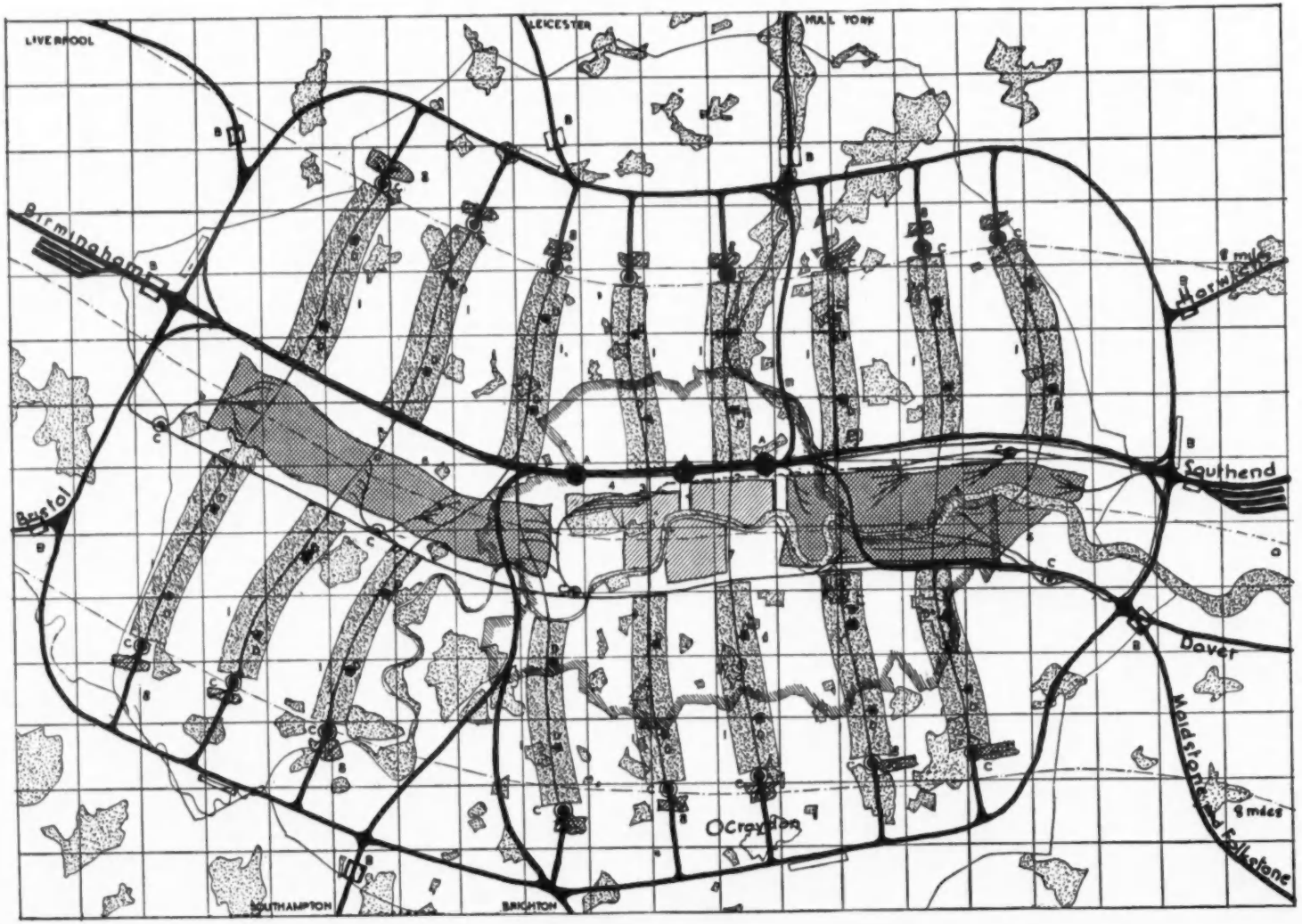



5. Tony Garnier's *Cité Industrielle* of 1901–1904. (A) industrial area, (B) technical schools, (C) civic center, (D) main railroad station, (E) sanatoria and rest homes, (F) river. Railway is dotted line (from Purdom, *Satellite Towns*).

model city flanked a river (F) and a railway which entered underground, and it was bisected by an arterial avenue. The residential area, a long thin gridiron with a civic center (C), lay astride the avenue and was separated from the industrial zone (A) by greenery; its houses were placed in communal gardens, isolated from through traffic. The industrial operations were massed (A), at one end of the housing, in close proximity to all three transportation facilities. However, except for the long street through its residential strip the city was linked to its transportation arteries only at a main station (D) and at the port, so that Garnier's could hardly be defined as a linear city. And his verdured elements seem to have more to do with Garden City than linear theory. But the elements of the Russian plan for Stalingrad was there, awaiting doctrinaire rearrangement in parallel lines.

14. The MARS Plan for London. The British Unit of CIAM, (Modern Architectural Research Group) MARS from 1938-1942, under the chairmanship of Arthur Korn, worked out a 'master plan' for Greater London, based on linear principles. As London proved to be too large to extend indefinitely in one line, they suggested that just its industry, commerce, and administration be set up along its primary east-west artery of Thames and railroads, and the residential zones be laid out along a series of secondary axes crossing the primary artery to produce a herringbone effect of sixteen ribs (Fig. 7). At their outer ends these secondary ribs might contain industrial units and would be connected to a great railway freight line that encircled the entire complex. Each residential rib would be about a mile wide, separated from the next one by a two-mile band of countryside that penetrated right into the fringes of the main artery of the city. No dwelling would be more than ten minutes' walk from its secondary artery or from open country. National north-south highways and railways would run uninterrupted through the intermediate country zones, hooking up directly with the primary east and west artery at its large central stations. Historic London would be retained within the width of the central spine.

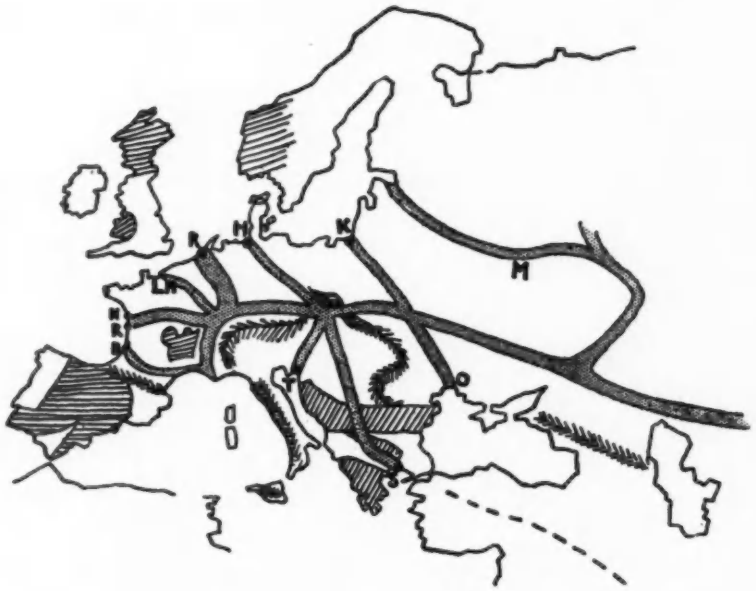
15. Le Corbusier's Linear Cities. The most influential adherent of linear cities lately has been Le Corbusier. Since his first schemes of towering, radiocentric skyscraper cities of 1922, we can observe his steady evolution in the direction of more open, horizontally-oriented and linearly-arranged utopias. In his 'Ville Radieuse' of the 1930s he first abandoned concentric planning for a more expandable axial arrangement. Lying athwart a highway-axis were to be, in order, the industrial zone with its freight yards, the residential-communal center, and the business center with the main railroad station. This type of plan was drawn up for Moscow and other world centers, and its axial extension may have been suggested to him by the contemporary Russian linearism with which he was acquainted. His axial highway was elevated and, in the case of his project for Algiers, he did not hesitate to run it across the top of his shoreline skyscrapers below. (See Illustration, EKISTICS, HIB-GA 9:51, January, 1960, page 51).



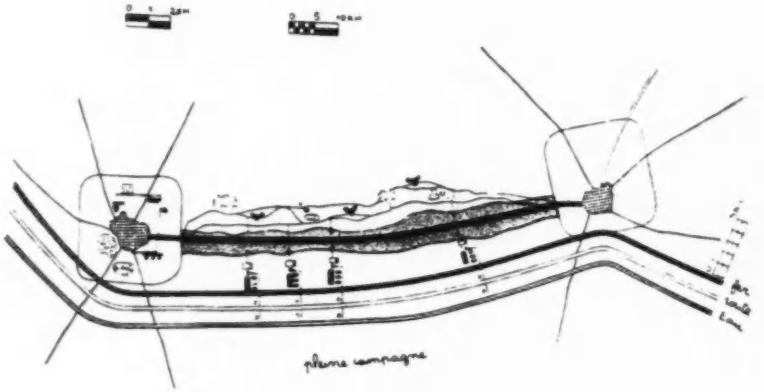

7. The MARS plan for London, 1938–1942 (from *The Architectural Revue* XCI, 1942, p. 150).

16. Le Corbusier's later version of linearism can be seen in his 'Cité Linéaire Industrielle' of the 1940s. He organized ASCORAL (L'Assembléd Constructeurs pour une Renovation Architecturale), a French unit of CIAM, and in 1942 this group presented the public with a world master plan based on a vast linear web. They printed maps of Europe showing linear cities stretching from the Atlantic to the Urals, from the Mediterranean to the North Sea (Fig. 9), just as Soria had described his project. They spoke of the 'three human establishments': concentric cities of business, linear industrial cities, and farming units round about in the countryside. The industrial linear city was to lie beside, not astride, the main arteries of transportation, just as Garnier and Miliutin had suggested, and was to serve as a connector, as Soria planned, between nuclear cities of business (Fig. 10). As at Stalingrad, industry must be placed adjacent to the arteries of heavy transport--the 'four routes': water, land, iron, and air. As the 1933 Athens Charter of CIAM insisted, this industrial complex was separated from the residential zone by a belt of greenery, in which Le Corbusier and his Russian predecessors placed the auto highway. The residential zone would contain his 'vertical' garden cities, along with 'horizontal' garden cities of detached housing and recreation and school facilities--all interconnected by footpaths. According to Le Corbusier, this industrial linear city would do away with the evils of the 'villes tentaculaires,' namely, the ribbon developments and suburbs now sprawling across the landscape. It should be understood that the linear plan is only one part of his three-pronged attack on regional problems: the others are the farming unit and the radio-centric city. The latter Le Corbusier retains as a second type of city plan, appropriate for business, university education, and other forms of activity necessitating frequent exchange.

17. Conclusion. The linear theory of city planning not only has had a long, continuous history since Arturo Soria started it off in 1882, but it is very much alive even in these days when utopian planning is generally unpopular. In 1952 Michel Kosmin (an urbanist involved in the postwar reconstruction of Tunisia) published a very complete project for the construction of linear cities and in the Spring of 1956 Reginald F. Malcolmson published in "Dimension" (University of Michigan) an article called 'Metro-Linear.' Thus, new mutations of the linear theory of city form appear at intervals.



9. Europe and its route-cities as envisaged by Le Corbusier and ASCORAL, about 1942 (from Le Corbusier, *Oeuvres complètes, 1938–46*).



10. The industrial linear city of Le Corbusier and ASCORAL, about 1942. Settlement units branch off at intervals from the transportation arteries which, in turn, connect the old concentric cities( from Le Corbusier, *Oeuvres complètes, 1938–46*).

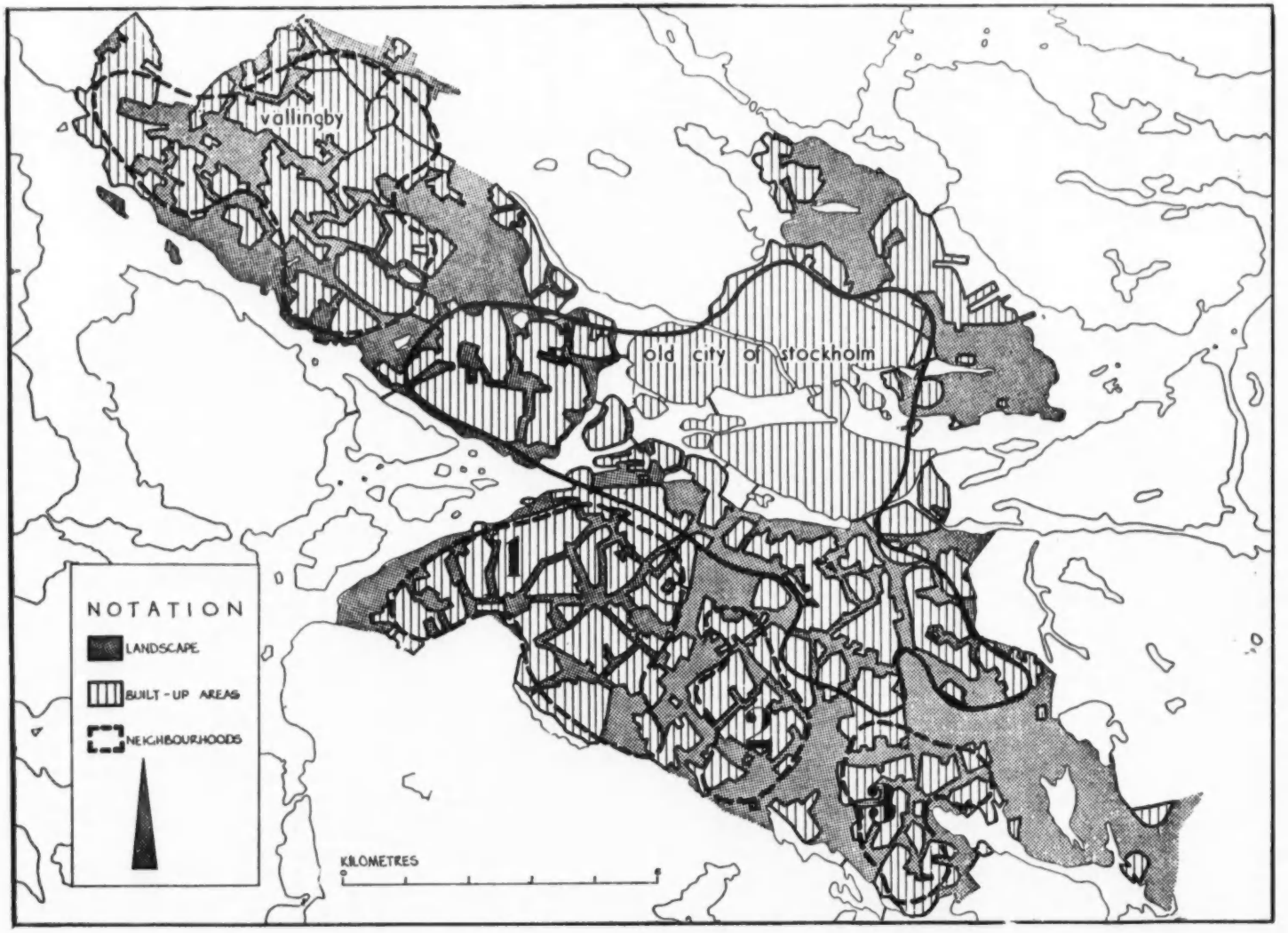
Tomlinson, Donald
THE LANDSCAPE CITY
News Sheet of the International Federation for Housing and Planning, Number LIII, October, 1959. Pages 11-14. Illustrations.
711.41 (100)

1. Both the linear city theories and the "garden city" movement have been major influences today. In this article Donald Tomlinson traces the landscape city movement from the growth of the tradition at Bath, England, through its codification by Ebenezer Howard, at the end of the 19th century, to some 20th century examples.

2. The Growth of a Tradition. The Royal Crescent at Bath, designed and built by John Wood the Younger, was completed in 1775 and represented a new conception of civic design. The point of departure stressed is the break from the "inward-looking" civic square to an outward-look towards the open landscape. The next stage in this development is exemplified by Regent's Park, begun in 1812: the prototype of a long line of Victorian "park suburbs." This was followed by the resort-town and then the in-town park schemes. Finally, there comes a stage when this is transferred from middle class development to housing schemes for the working classes backed by the Industrial Philanthropists of the late 19th century--Saltaire (1851), Copley Village (1853), Bournville (1879) and Port Sunlight (1888).

3. The Garden City Movement. It was in 1898 that the tradition became a social code: for it was in that year that Ebenezer Howard published his important book, "Tomorrow: A Peaceful Path to Real Reform." The book was an immediate success. In 1903 Howard formed a Limited Company to finance the first Garden City at Letchworth, outside London. Raymond Unwin and Richard Barry-Parker, its architects set out to make the housing estates at Letchworth deliberately "picturesque" --in the manner of the middle class "park suburbs" --extending this principle to the complete town. In 1919 a second Garden City was begun at Welwyn, and more and more municipal housing estates were built on "garden city" principles. But with the spread of the automobile country roads leading out from the towns were soon lined with ribbon development, and by the early 1930s the Garden City had degenerated into a more formula. Housing layout moved further and further away from the principles of Howard and Unwin.

4. Modern Developments. It was about this time that a new conception of the Garden City appeared. This was the "vertical" Garden City, a concept which largely originated from the visionary projects of Le Corbusier in the 1920s. La Ville Contemporaine (1922) has a relationship with Howard's Garden Cities diagram. The details, of course, are different, but the conception remains the same: notice the satellite towns on the periphery, the emphasis on the central park, and the




*Plan for the city of Stockholm. Note green wedges separating built-up areas*

extensive use of landscaping. The essential difference is that Le Corbusier envisages a city of skyscrapers and flats, each building widely spaced in open landscape; but his social aims are much the same as those of Howard: "With the aid of modern techniques Mankind must be rehabilitated in conditions of Nature . . . sun, space, light and trees are the essential joys." The social philosophy of Le Corbusier is probably best illustrated in the first Unité d'Habitation building, the controversial Marseilles Experiement. Inside one building he has housed what amounts to a whole suburb: sixteen hundred people, with schools, shops, clinics and other social ancillaries.

5. The Garden City has been most successful, though in a modified form, in Sweden. The Swedes were early exponents of the "satellite" principle, building Sundbyberg (1876) and Nynäshamn (1900) as satellites of Stockholm. Today in Stockholm, we have perhaps the complete example of the Vertical Garden City: a city predominantly of flats, and yet a city of "sun, space, light and trees." Continuous wedges of open space and natural landscape thread their way through the city, dividing it into smaller units. Thus, the Stockholm of the future will "read" not as one large city but as five or more small towns set in open landscape. Only the central core of the city will have what is described as a "metropolitan" character. The new areas of the city will be self-contained satellite towns, not suburbs, and are being laid out on "garden city" principles, with flats of course predominating. (See Figure on page 255).

6. At Tapiola, one of Finaland's new towns, the principles of the Landscape City have been taken a stage further. (See EKISTICS, 7:40, pp. 140-142). What the architects have set out to do is to "lose" the town in the natural landscape of the site, largely lakeland the forest. Its buildings are discovered in tight little clusters, and the countryside in between these clusters rmains relatively untouched. There are plenty of flats and terraces, so the density is quite high. Thus, at Tapiola the illusion is complete: the town finally "dissolves" altogether, and the landscape becomes once more dominant.

7. Conclusion. The evolution of the Landscape City is the story of the progressive invasion of the town by the landscape. Before the 18th century, towns were still relatively small and compact, and the townsman was never very far removed from the open landscape. Later, as towns expanded and became more numerous, the countryside tended to become more remote and had to be created artificially, in various forms, within the town. In the course of time, a sense of "openness" became almost a requirement in residential planning. The urban traditions of compactness and enclosure begin to break down. In our own century, the idea is university applied, not on behalf of one class or neighbourhood, but to whole cities.

Aalto, Alvar

IMATRA -- A PLAN FOR A NEW CITY IN FINLAND

"der Stadtplan von Imatra, Finnland," Werk, November, 1959. Pages 400-403. Illustrations.

711.4 (480)

1. The statements of Alvar Aaalto, regarding his plan for the region of Imatra, have been abstracted from the original text by Ulrich Stucky. Imatra is the result of the relocation and reorganisation of large segments of the population and of industrial areas which were annexed from Finland to Russia at the end of World War II.

2. Principles and Structure of the Plan. Imatra is the largest borough (extended city with some agricultural land) in Finland, and consists of 15,000 hectares (57 square miles). Imatra has resulted from the unusual circumstance of having three different centers of population under one local administration and an unusual combination of land uses; 11 percent in thickly settled developments, 14 percent agricultural land; 12 percent industry and transportation, and 63 percent forest.

3. Imatra is unified by the course of the Kuoksi River which flows into the Saimaa Sea. Its quiet waters are terraced on the sides by power stations which form a central dominating element, in the final plan. Industrial developments at the other end of Imatra near the Saimaa Sea concerned with wood and wood processing were also preserved and further developed in the plan.

4. A primary objective was to maintain existing settlements in present locations, creating new centers only where circulation and sites were favourable. Between each settlement the agricultural land was connected to form an undivided green network.

5. A Center for Imatra. None of the three existing centers were able to perform the functions of a community center for the whole borough. A new community center, of equal importance to all districts, was determined to be a dominating feature of the plan. It is strengthened by residential development, the circulation system, and a site on the central range of hills overlooking the Vuoksi River, and new both the railroad center and the most important intersection of the regional and local street system.

6. Residential Areas in Imatra. The residential plan has three main objectives:

1. The formation and integration of previously scattered developments into unified areas;
2. The creation of new residential areas that are functional in their location and internal organisation; and

3. The grouping of existing scattered rural settlements into villages with farm houses, small land holdings, etc.

7. Areas in single family houses contain 37 percent of the population. These areas were selected so that economical building types could be constructed. Parcels suitable for cultivation were preferred in order to make it possible for the owner to augment his income. Furthermore, the subdivision of residential areas is flexible so that various building types can be accommodated without disturbing the over-all organisation. The apartment blocks vary from three to five storeys. In most cases the residential and commercial buildings are grouped around a community center.

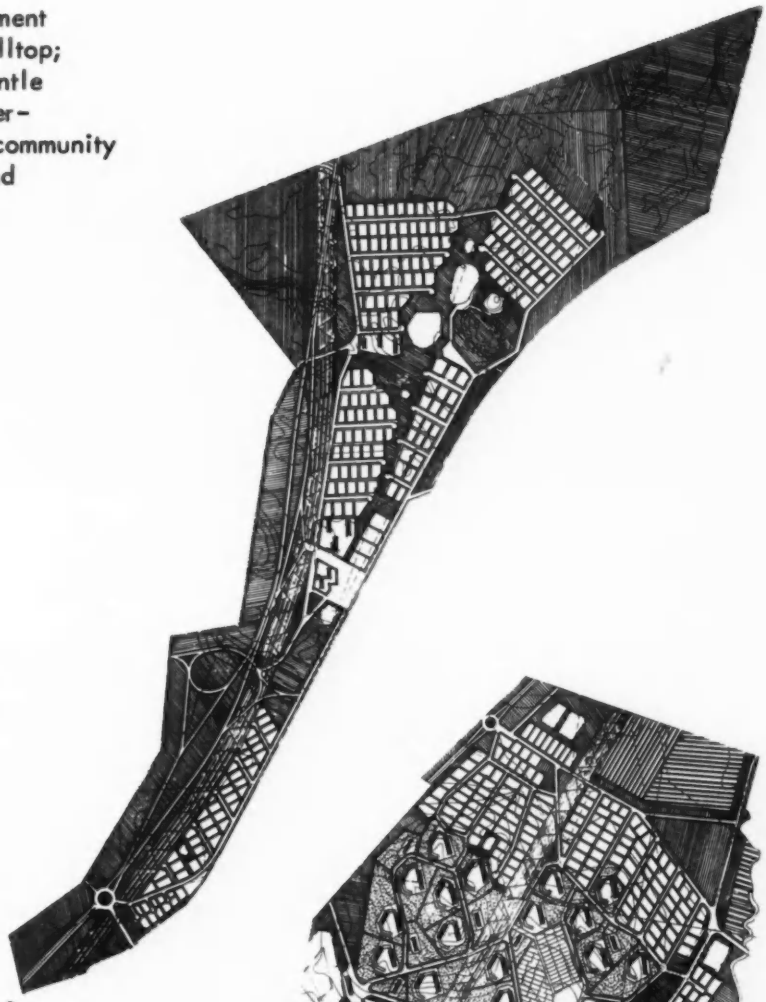
8. Shopping Centers. The most important shopping centers were already existing when the plan was developed. Their main weakness consists in their planless development. Business and residential streets were both utilized by through traffic, resulting in constant problems. A new system of local and through streets resolves this and expands the efficiency of these centers. In addition, three new shopping centers are planned: one near the government and community center; one near the main railroad station and central bus station; and one between the station area and Vuoksi, to which a school, church, and athletic facilities will be attached.

9. The Organization of Imatra and Surrounding Areas. Imatra, like all other urban areas, has the problem of fringe developments that surround a unit without plan and in time must be united with it. The transformation of these fringe developments into real parts of the planned urban organism can create insurmountable problems. Such fringe development problems can be prevented only if the city is separated from rural settlements at an early date by an adequate greenbelt in which building is prohibited. In this respect Imatra is favorably situated between water, a national border, and independent neighboring communities. The general plan of Imatra, itself, is divided into 27 individual districts, 7 agricultural areas, a group of islands, a park reservation with an athletic center and cemetery, and 2 industrial districts. These were delineated so that each one is functionally united with its own center and the center for all of Imatra.

10. Specifications for Implementations. The realization of the plan depends upon the carrying out of a building and transportation system to adhere to it, in a proper sequence. The first priority in its realization is the building of the work areas, commercial centers, and major traffic arteries. The plan does not seek to inhibit the architect, but provide him an image of the whole urban complex. From the general specifications provided, it then becomes possible to fill in the details according to the specific requirements of the site.

2. Imolo. The industrial community strung out in the form of a chain with three links: the shopping and community center connected directly with the industrial area; pedestrian zones in the interior woods and park system; a cluster of community buildings.

3. Virasoja. Three story apartment blocks, terraced on the wooded hilltop; and single family houses on the gentle slopes. Park and forest zones interconnected with public buildings, community facilities, school, kindergarten and athletic facilities.



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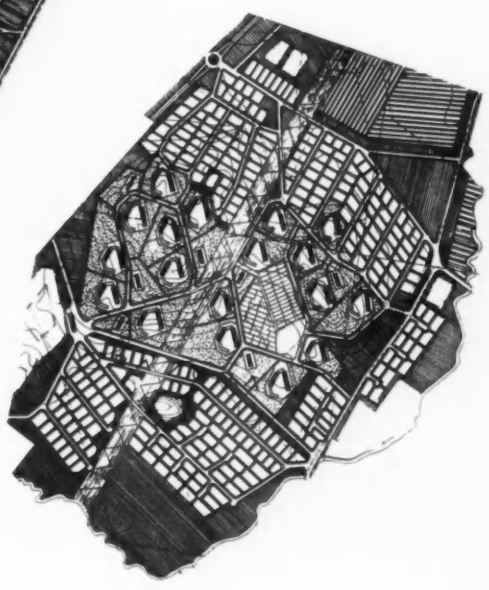


3

Techniques and Architecture
BAGNOLS-SUR-CÉZE, A NEW TOWN INTEGRATED WITH AN OLD CITY
"Techniques and Architecture," No. 6, October, 1959. Pages 88-95.
Illustrations.
711.4 (44)

1. Bagnols-sur-Céze could be identified as a new vertical garden city planned to serve the location of new industry, instead of relieving the congestion of a metropolis. It provides an interesting contrast, in its open relation to the landscape, to the old medieval walled town which is completely turned inward.

2. In 1954, the Atomic Engergie Commission began the construction of its first nuclear energy plant. A traditionally agricultural region was chosen for its site, thus posing a problem of creating a place to live for the many workers and their families who would be coming to the region. It was decided to build a new urban center for the personnel of the plant, near the ancient and picturesque walled city of Bagnols-sur-Céze.

3. In 1956, Bagnols had a population of 5,000. The building of the new town began on the 20th of March 1956, and proceeding until today the population of Bagnols is 12,000 and by the end of 1960 it is expected to be 18,000. Thus, in a period of four years the population will almost quadruple.

4. The ancient town is dominated at three points, by a Roman tower, and two gothic steeples, and the new town counterpoints this emphasis in its placement of three more towers, each 15 stories high among its predominant one to five floor buildings.

5. The integration of the new city posed not only problems in terms of form, but the problems of giving the people a feeling of unity. Architects and planners worked with the municipal government to bring the people who lived in the new area and the older citizens together. Many measures have been taken with this effect. On the other hand, even though the new city is separated from the old, it is a neighbor and the newcomer mingles with the traditional way of life. On the other hand, the ancient city will profit from its relation with the new. A common civic center built between the two settlements will have a theatre, hotel, cultural buildings and sports grounds.

6. Illustration. (facing page)

1- Quartier de "la Citadelle." The first residential area of 370 units was built extremely quickly during the study of the principal extension of the town.

2- 3- 5- 7- 8- "Les Escanaux." This is the principal extension of Bagnols-sur-Céze and contains 1,200 residential units: (2) the sports center, stadium, gymnasium,

swimming pool, and park; (5) cultural center; (7) commercial center with theater, cinema, meeting halls, museum, public gardens, and hotel; (8) shops and pedestrian mall. "Les Escanaux" is characterized by high densities at the periphery which carries the traffic out around from the center, allowing it to be free for pedestrian circulation.

4- A garden suburb "Le Bosquet." In this area there are 30 houses which serve as residences for the executives of the Atomic Energy installation.

6- An open air theater. This is reconstructed from the remains of a Roman amphitheater.

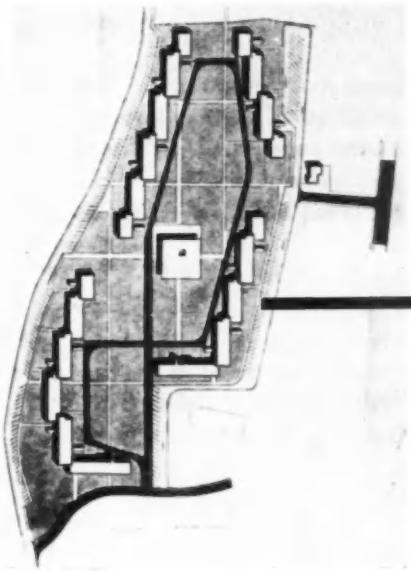
9- Future Western extension. The first area to be built is the sector "La Coronelle." It is composed of 80 units in horizontal and vertical slabs and will house people from the older city, in relation to a program for renovation of unsanitary housing.

La Coronelle

Les Escanaux

La Citadelle

Le Bosquet



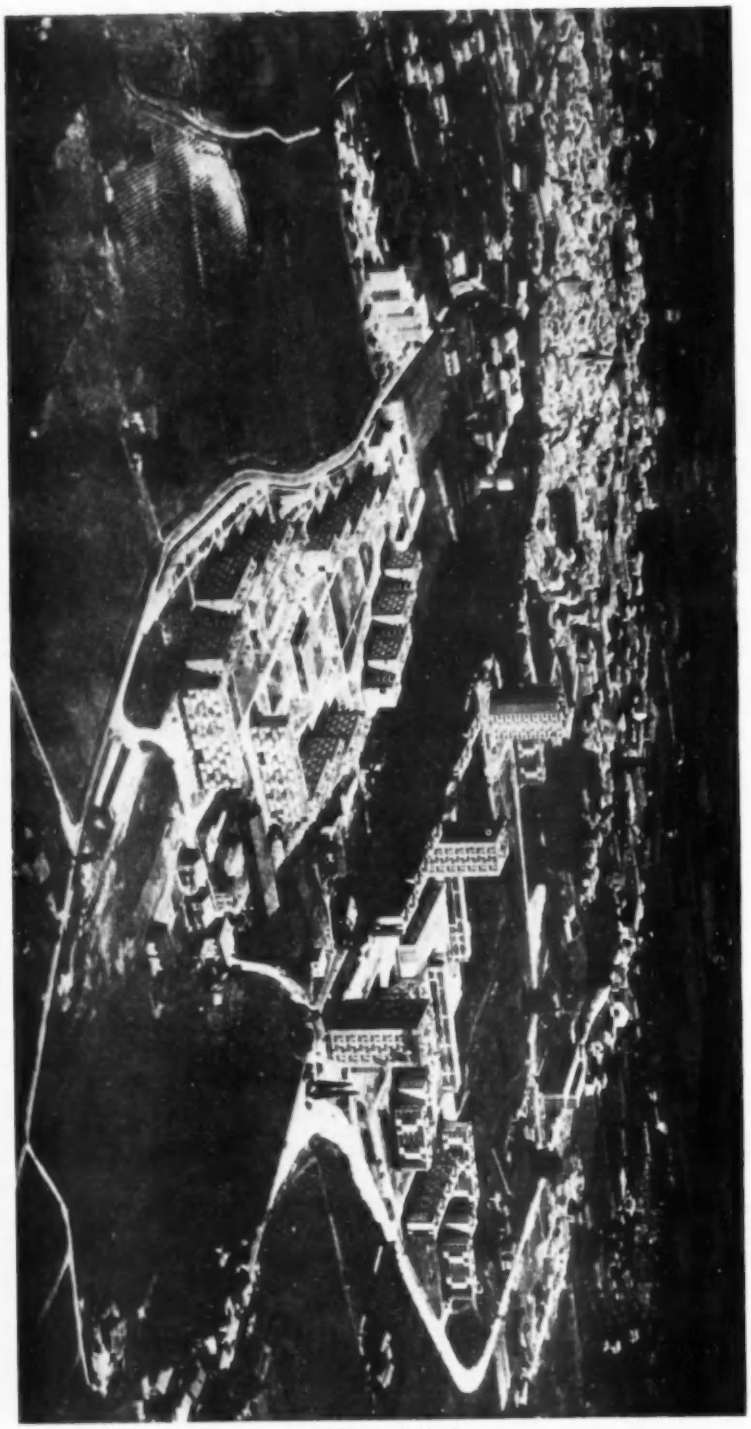


Photo : Travaux Aériens du Midi et de l'Afrique du Nord

Holzbauer, Wilhelm
MODULAR DESIGN IN RESIDENTIAL AREAS
der aufbau, 9, 1959. Pages 320-324. Illustrations.
721.013 : 711.58 (100)

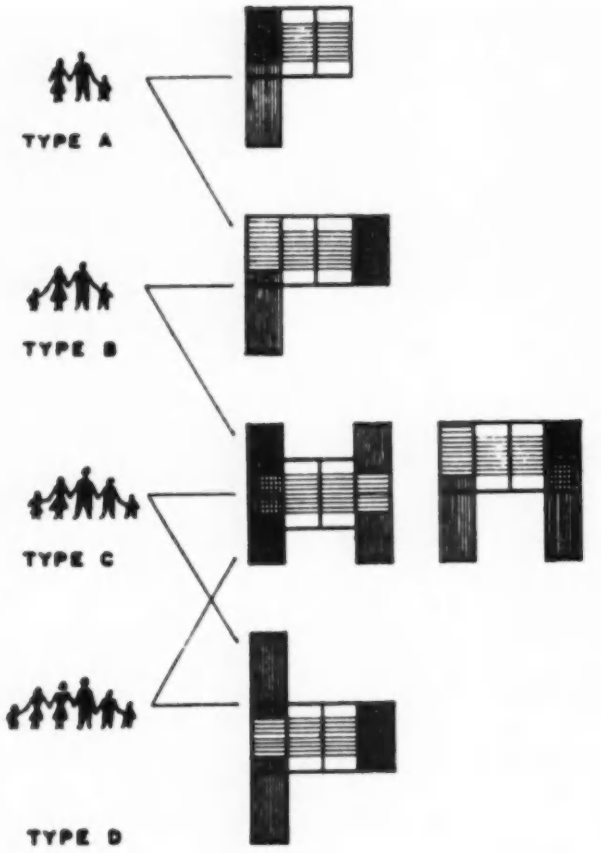
1. EKISTICS has abstracted a large number of articles on modular design and construction from various points of view. Notable among them in the last year have been the series of information sheets by Bruce Martin which appeared in issues from January through July, 1959; and "Modular Coordination and Building Costs" by Cyril Sweet in the August, 1959 issue. Wilhelm Holzbauer, an architect educated at Massachusetts Institute of Technology, has approached this subject in terms of its potential in residential areas and given examples of two proposals, one in the United States and the other in Germany.

2. Modular units based on industrial standardization are especially suited for the constant elements of our world, both in economic-administrative aspects as well as in the expression of visual principles and type. Modular construction also makes it feasible to transfer more parts of the construction process from the craftsman to industrial production.

3. In order to illustrate various possibilities of using a single modular unit of a given size, two examples are presented. These examples differ both in internal structure of the community as well as in the building type of the single house. One is a project for the Per-Albin-Mansson Development North; the other is a project for a neighborhood in the suburbs of Detroit, U.S.A. In both cases the entire area was divided into units measuring 64 by 64 meters (approximately 210 feet by 210 feet). These parcels in the German example each contain 28 to 30 dwelling units; in the American example, 12 to 14 dwelling units.

4. Through various combinations of a structural space unit of 4 by 8 meters (approximately 13 by 26 feet) practically endless variations in dwelling type is made possible. This space module is composed of four pre-stressed concrete-steel piers on which two pre-stressed beams rest. The space is covered with prefabricated roof panels. All these parts are factory produced and put together, dry, on the site.

5. The size of the spatial unit is governed by the requirement that it be large enough for flexibility: to permit future changes without having to alter the structural shell. In addition it must necessarily be small enough to make possible a great variety in the combination of the units. The separation of structural and non-structural is a further fulfillment of the goal of flexibility, especially insofar as the vertical structural parts are reduced to a few thin piers.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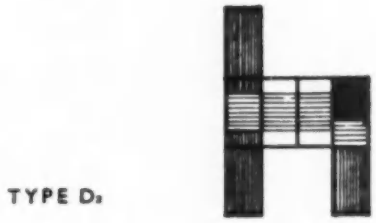
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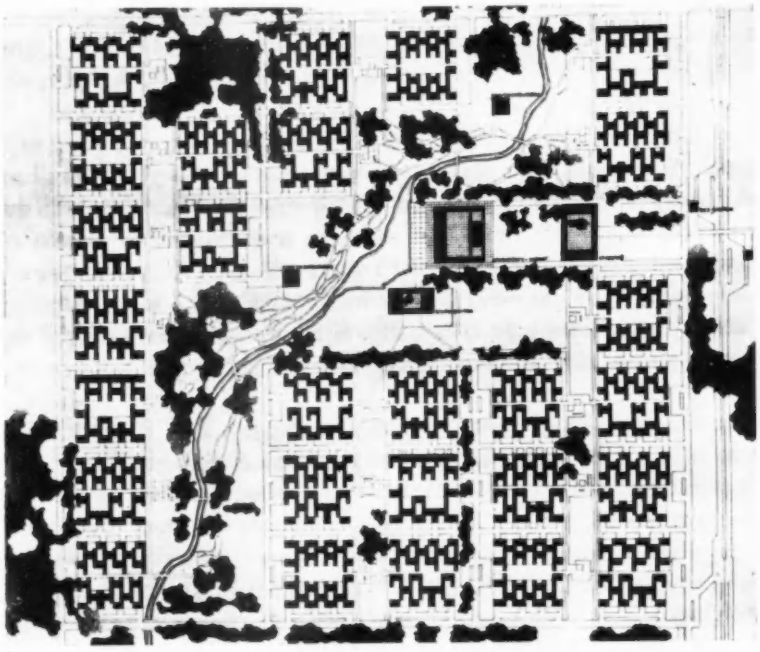

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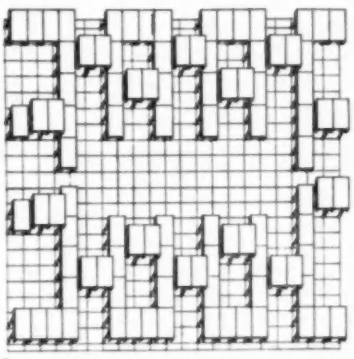

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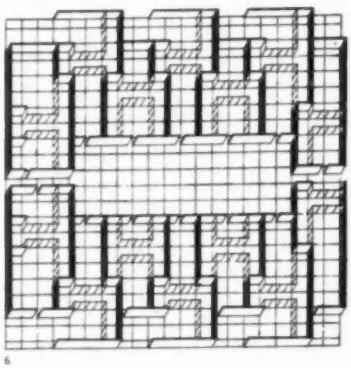


6

6. The great opportunities for variation in the application of this method makes it possible to avoid monotony. Rather a type of space is provided that can be distinctively treated in each individual situation. However the modulor coordination always relates the individual parts.

7. Every urban residential area must provide for a concentration of dwelling units, and at the same time make possible privacy for the family, social and coherent form. Modular design enables the varied needs of both the individual and the community to be harmoniously interwoven.

8. In such designs, it is necessary to foresee changes and progress in the way of life, and to create a framework for living that can grow and change with use. If we were to plan on a lower plane, on the basis of standardized and accepted poverty, it would have a tragic effect on the possibilities of life for future generations.

Pabst, Jr., William R.
STANDARDIZATION IN INDIA
American Society for Testing Materials Bulletin, No. 242, December, 1959.
Page 31.
389.6 (540)

1. William R. Pabst, Jr., a member of the American Society for Testing Materials Committee on Quality Control of Materials, recently returned from India, where he had served as an advisor on quality control to the Government under the United Nations Technical Assistance Program. During his year there, his primary work was in advising Indian industry in the use of quality control methods for increasing productivity. In laying out specific control procedures for companies, he saw positive results in increases in productivity from 5 to 15 percent. Thus, the control of quality standards is shown to be one way in which nations can effectively increase their output. For this reason, EKISTICS presents this short review of the present level of standardization in India.

2. The authority on standards in India is the Indian Standards Institution (ISI). Supported mostly by 450 or more member companies, its primary purpose is to develop and publish standards. ISI committees bring together government, industry, and consumer interests, to prepare and approve standards. At these meetings, held in many of the larger cities, ISI has developed and approved over a thousand standards. A statistical group has been formed which participates in the development of individual standards for commodities and materials and is also interested in the preparation of general statistical standards and the enforcement of the Indian Standards Seal.

3. The ISI Seal. Companies licensed under the ISI may be authorized to use the ISI seal on products which conform to established standards. In using the seal, the companies agree to make tests and inspections in a specified way to assure conformance of products with the standards. ISI verifies the conformance by both examining the manufacturer's records and data at the plant once or twice a year and by examining products purchased in the market. Lack of conformance may result in loss of privilege of using the seal. As yet there is not universal recognition of the seal, and therefore it is really only playing a significant role in the export market. More or less universal use of the seal may require a long process of education.

4. The Indian Standards Institution is playing an effective role in the industrialization of India. Its fabric of standards is developing. It is providing training in the use of standards and encouraging interest in quality control techniques. It has gone far in the theory of statistics and their use in standards.

Conference on Demographic Problems
RESEARCH -- A POSSIBLE APPROACH TO THE PROBLEM OF OVER-POPULATION
The Caribbean, Vol. 13, No. 10, October, 1959. Pages 194-195.
312 (729)

1. In the February EKISTICS (HIB-GA 52) an article on " Social Development and Migration" was adapted from the Report of the Conference on the Demographic Problems of the countries served by the Caribbean Commission. The Conference underlined the basic necessity for valid and comparable population, vital and social statistics for framing action programmes. It is this aspect which is now presented in EKISTICS.

2. Data Collecting. The need for more comprehensive, accurate and comparable demographic data is because these, together with related social and economic data, constitute the foundation stones on which sound economic and social policy must be based. Fundamental among the necessary statistics are those which reveal the size, characteristics and distribution of the population.

3. Demographic Studies and Research. Collection of information on populations, and their presentation in the form of tables do not meet the needs of government planners and policy makers. For the material to be of maximum value it must be analysed and interpreted in relation to economic and social programmes.

4. It was agreed that in carrying out further research particular attention should be given to the following types of demographic studies, which have not as yet been fully developed in the Caribbean:

a. Evaluation of the accuracy of population censuses and vital statistics.

b. Levels of birth rates and differences in birth rates according to social status, urban or rural residence, education and the like. Such studies would be of value in preparing estimates of the population at future dates. Of especial importance was the study of fertility differentials by type of family union, and the duration of exposure to the risk of pregnancy was highly relevant to such enquiries.

c. Attitudes towards family size, practices of family limitation and the like. Information on these subjects, which may best be obtained through sample surveys, is required by Governments wishing to consider specific programmes for population control.

d. Causes of sharply falling death rates in many parts of region. Such studies should aim at illuminating, for example, the quantitative relationship between the decline in mortality and the supply of drugs, antibiotics, etc.

e. Population projects by age and sex. Such estimates are valuable both for assessing possible future levels of consumption as well as for estimating manpower resources. Certain advantages were seen in preparing two or more projections for a given date, based on different estimates of birth and death rates and migration levels. Estimates of the future size of the labour force by age and sex give a better indication of the future labour supply than a simple estimate of the population.

f. Development of methods and definitions for measuring employment, unemployment and under-employment suitable to Caribbean conditions; and analyses of the extent and characteristics of these phenomena. The sample survey may prove to be the most effective means of obtaining such information.

g. Employment patterns of young persons who have completed various levels of formal education.

United Nations Review
REFUGEES--AN EVER-CHANGING PROBLEM
United Nations Review, Volume 6, Number 6, December 1959. Pages 22-27. Illustrations.
325 (100)

1. Since 1960 is World Refugee Year, EKISTICS has abstracted an article on the problem of refugees as it is directly related to the housing and planning policies of any nation and attempts at their solutions must be co-ordinated. Dr. Auguste R. Lindt, United Nations High Commissioner for Refugees, has outlined the continuing and changing problem of refugees throughout all nations of the world.

2. Dr. Lindt characterized the refugee program during this last year by three main facts:

(1) Concentration of efforts and means on clearly defined refugee problems was showing its effect more and more, so that problems could now be reviewed with hope;

(2) Some of the problems could not be finally settled by his office, for its action could be only of a strictly humanitarian and social character;

(3) The World Refugee Year had already made a useful impact.

3. In Europe, gradual solution of the problem maintains its impetus. In the autumn of 1958 there were 160,000 non-settled refugees in Europe within the mandate of the High Commissioner's Office. In the autumn of 1959 the non-settled refugees were estimated to be 110,000 while the camp population had decreased to 22,000. That this reduction in the number of "waiting people" has been possible, despite a small influx of some 6,000 refugees during the past twelve months, was a tribute, Dr. Lindt said, to a broad combination of efforts on the part of governments, intergovernmental organizations and voluntary agencies.

4. The operation in Tunisia and Morocco is financed from a special fund, distinct from the other resources of the office. The implementation of a General Assembly resolution recommending continued action on behalf of refugees in Tunisia on a substantial scale had been made possible by the solidarity demonstrated by governments, the League of Red Cross Societies and its affiliated Red Cross, Red Crescent, and Red Sun Societies and by other non-governmental organizations. There are approximately 180,000 refugees in Tunisia and Morocco, but there are no camps. The refugees are spread over a wide area in both countries, living mostly in self-constructed gourbis, which are round huts made of stone and mud, covered by branches and mats, or in tents.

5. The operational budget for refugees for twelve months is about $6 million, an amount made up of approximately $3 million, the estimated value of donations and services contributed in kind, and a further similar sum which is the estimated cash requirement. An important development was the dissolution on December 31, 1958, of the United Nations Refugee Fund. Beginning in January 1959, a more flexible pattern of programs was adopted under General Assembly resolution 1166 (XII), according to which annual programs appropriated to each separate refugee problem are approved on an ad hoc basis by the newly established Executive Committee of the High Commissioner's Program. The 1959 programs, as well as those for 1960, give priority to the Program for Camp Clearance and to the Far Eastern Program. The 1959 and 1960 plans also include a program for non-settled refugees living outside camps, a program for new refugees in Greece, a legal assistance program and an emergency account for individual cases.

6. The Far Eastern program is a joint operation between the High Commissioner's office and the Intergovernmental Committee for European Migration (ICEM), involving the resettlement overseas of refugees of European origin now in the Far East. In the first nine months of 1959, some 1,300 refugees were moved overseas from Hong Kong, leaving 8,500 on the mainland. A further 3,800 visas are required before the program can be terminated.

7. Intensification of camp clearance, begun in 1958 and due to continue until the end of 1960, is designed, to provide permanent solutions for the 23,700 refugees living in 114 official camps on July 1, 1959. Almost without exception these are refugees who have been living in camps for more than ten years. The number qualifying for camp clearance is 15,800. One of the problems viewed with scepticism, not least by the refugees themselves, is whether it is possible to settle people who have endured for so many years the deteriorating effects of camp life. But when camps have been actually closed--one or two symbolically burned--the atmosphere has changed. Concrete solutions have been found for each individual case. The clearance program has brought a new atmosphere and refugees are starting to discuss the future and life outside camps.

8. The interest shown in the Latin American countries during recent times marks a new step forward in the collective efforts to solve refugee problems. Though many Latin American countries find themselves confronted with varied and difficult economic and social programs, they have shown an attitude of open and keen collaboration by their willingness to consider measures to liberalize the criteria for the reception of refugees.

9. Resettlement of out-of-camp refugees is limited. However, with the prospect of completing the camp-clearance program and the Far Eastern program by the end of 1960, it is possible to look forward to a more substantial attack on the problem of non-settled refugees out of camps.

UNESCO Regional Centre for the Western Hemisphere, Statistical Division of the UNESCO Department of Social Sciences and Dr. A. J. Jaffe
DEMOGRAPHIC DATA AND ANALYSES RELEVANT TO EDUCATION PROGRAMMES
United Nations Seminar on Evaluation and Utilization of Population Census Data in Latin America, 30 November-18 December 1959, Santiago, Chile. Mimeographed Paper. 30 Pages.
312:37 (100)

1. This paper has been prepared by the UNESCO Regional Centre for the Western Hemisphere and the Statistical Division of the UNESCO Department of Social Sciences. Statements relating to the methods of forecasting school-age population and the future composition of adult population with regard to levels of educational attainment were contributed by Dr. A. J. Jaffe of Columbia University, New York.

2. Most countries are concerned with extending their educational programmes so as to encompass the entire population of school age and provide the maximum educational opportunities possible for their inhabitants. Any extension of a school system is expensive; furthermore, the buildings and other physical aspects of an educational system take considerable time to construct, and once built, are geographically inflexible. This is to say that a country must plan ahead and must estimate how many persons of school age there will be and where they will be living at some future date, in order that an expansion programme can be carried through efficiently. In addition, it is necessary to estimate how many teachers will be needed at some future date, since several years may be required to train them.

3. Present Numbers and Characteristics of the School-Age Population. Census data on the population of school age, classified by sex and single years of age, are an essential yardstick by which to evaluate the school system as well as an indispensable basis for estimates and forecasts of the future school-age population. The statistics of the school-age population may be used to show the magnitude of needs for school facilities and also to compare with statistics of actual school enrollments and to gauge shortcomings in the latter. Primary and secondary school enrollments may fall short of the numbers of children of corresponding ages in the population, either because existing school facilities are insufficient or because some children do not take advantage of the facilities provided.

4. For any study of this type, it is necessary to clarify the meaning of the term, school-age population, which may refer either to the population of elementary or primary school age or to the age-group for which school attendance is compulsory. In the latter case, the school-age population may include, in addition to children of elementary or primary school age, some who are of post-primary school age. Another consideration is that the legal school attendance provision does not always require school attendance up to the specified limit.

5. Future Numbers and Characteristics of the School-Age Population. Projections of the school-age population are indispensable in order to assess needs for the long-term future, establish goals, and determine intermediate stages of development of the school system, according to available resources. An illustration of the uses of population projections in educational planning is provided in the following table, which shows the primary school-age population (7-12) in Panama in 1955, the respective school-going population and the population 7 to 12 years of age estimated for 1966. In 1955, 80 per cent of the population 7 to 12 attended school; in the projection for 1966, 100 per cent enrollment for this age group is assumed.

PROJECTION OF PRIMARY SCHOOL POPULATION IN PANAMA 1955-1966

| | 1955 | | | 1966 | |
|---|---|---|---|---|---|
| Age | School Age Population | Primary School Enrollment | Per Cent Enrolled | Estimated Primary School Enrollment | Annual Rate of Increase in Enrollment, 1955-66 |
| 7-12 | 132,220 | 105,222 | 79.6 | 174,840 | 4.8 |
| 7 | 26,170 | 17,403 | 66.5 | 34,610 | 6.5 |
| 8 | 23,500 | 19,388 | 82.5 | 31,070 | 4.4 |
| 9 | 20,710 | 18,536 | 89.5 | 27,380 | 3.6 |
| 10 | 22,810 | 18,980 | 83.2 | 30,170 | 4.9 |
| 11 | 18,220 | 16,763 | 92.0 | 24,090 | 3.4 |
| 12 | 20,810 | 14,152 | 68.0 | 27,520 | 6.2 |

6. The estimated annual rate of increase in enrollment necessary to attain the established goals would imply 5,051 more primary school pupils enrolled in 1956; 5,293 more in 1957, and so on. The proposed average number of pupils per teacher and per school room and the average cost per pupil would determine the necessary resources. In turn, the availability of resources would determine the actual annual rates of increase. It may be noted that from four to five years may be required to supply the number of trained teachers needed, and that consequently the annual rates of increase might have to be adjusted accordingly. Reliable data on the actual situation, such as capacity and condition of existing schools, proportion of unqualified teachers, pupil-teacher ratios, and the geographic distribution of primary school in relation to the present and future primary school-age population and to population density, are needed in order to adjust the rates of increase and execute educational programmes in accordance with actual needs.

7. Short-term forecasts are easier to make and are more likely to prove accurate than forecasts for longer periods of time. This is so because the population of school-age in the near future is already living at the time of the census. For

example, suppose that on the basis of 1960 census statistics, the education authorities of a country wish to estimate the 1965 school-age population. All the children who will be alive in 1965 are already living in 1960. It is only necessary to estimate the number of deaths which will occur between 1960 and 1965, and project the 1960 population accordingly.

8. Projections for up to one decade into the future, for the various regions of a country, are relatively easily made. In its crudest form the type of projection described above can be made for each region. In so far as possible, internal migration should be taken into account. Within such short periods of time, however, the volume of internal migration may be small enough for regional projections in which migration is not taken into account still to be useful. This is particularly true for large regions: provinces for example. On the other hand, small geographic areas and individual cities may experience large amounts of migration even within short time periods. For fast growing cities, it may be difficult to make accurate and useful forecasts of the population of school-age, even in the short run, unless the analyst has a large body of information which permits him to estimate future migration fairly accurately.

9. Forecasts for more than one decade are much more difficult to make, and likely to be much less accurate. The method is the same; the population as of the census date is projected according to the mortality estimated to occur in each age and sex group during the forecast period to the year desired. Since the school age-population is in the younger ages, however, it is highly important that the number of births which will occur during the forecast period be estimated as accurately as possible, together with the number of deaths of those children yet to be born. Long-run forecasts for cities, urban-rural segments, and regions of a country are even more difficult to make with any degree of precision because of the lack of probably accuracy of long-run internal migration. In spite of this, long-run projections for separate areas of a nation, or urban and rural projections, are important and may usefully be attempted on the basis of a careful study.

10. School Attendance and Enrollments. A diagram of school enrollment provides an effective method of recording the essential data on the way the population takes advantage of existing school facilities. (See Chart: Demographic-Educational Structure, Japan 1952, page 39). Such a diagram shows, for each one-year age group what percentage attend school and, at a glance, gives the profile of the school-going population, relates enrollment to the total population, and brings out the relative importance of different types of schooling. However, a study of this nature confronts two difficulties:

a. the fact that demographic and school statistics come from different sources and often refer to different dates in the year;

b. the present impossibility of securing a common set of components (primary, secondary, etc.) for the educational system.

JAPAN

The Japanese population and the number between 0 and 30 years of age enrolled in educational establishments in 1952.

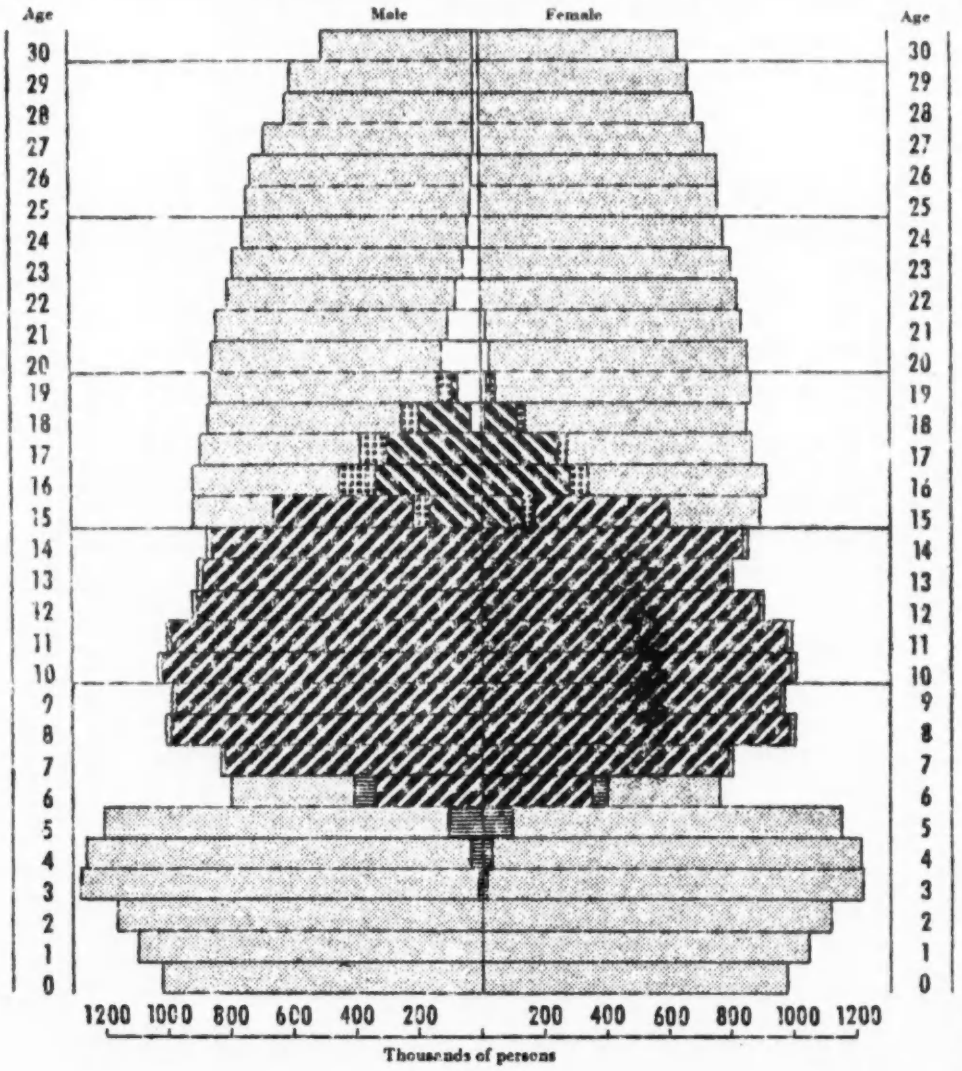
*Source*

Based on the publication *Education in Japan: Graphic Presentation*, issued in 1956 by the Ministry of Education, by permission of the Japanese National Commission for Unesco.

*Key*

- total population
- pre-primary
- primary and lower secondary
- upper secondary, full-time
- upper secondary, part-time
- higher education

DEMOGRAPHIC-EDUCATIONAL STRUCTURE: JAPAN 1952



11. Census data on the school-going population (school attendance) by level of education eliminate these difficulties and, despite any possible short-comings, provide the elements necessary for such a study. Further, tabulation of data on school attendance by grade in the relevant level provides the age-grade distribution of the school-going population, i.e., the statistical information necessary for the study of such problems as retardation, the holding power of the school, and other aspects of the working of the school system. The specific age-grade-sex school enrollment rates provide elements for the estimation of future school-going population, and the future educational level of the population.

12. The smaller the attendance ratios, the more important for educational planners at the elementary or primary school level is the residual school-age population--that part of the school-age population which is not attending school. This group comprises persons who have already completed the existing grades or left school before completion, and persons who have never attended school. For intelligent planning of the extension of primary education facilities, elimination of existing obstacles to regular school attendance, and the improvement of educational standards, additional data on this residual group are useful, on such aspects as: reason for leaving school and the economic activities of those who have had some schooling. For those who have never attended school, this additional data may give the principal reasons for non-attendance, such as lack of schools, lack of capacity in existing schools, the need to work for a living, and inability to afford clothing, textbooks, etc.

13. Educational Attainments of the Population. The effectiveness of the literacy measure as an indicator of educational development is limited. According to the concept of functional literacy gradually developed during the last quarter century, an individual is considered functionally literate if he has acquired, in the matter of reading and writing the theoretical and practical knowledge that allows him to take part efficiently in all those activities that, in his culture or group, normally would result from elementary school instruction. In general the amount of formal education considered necessary for the average individual to become functionally literate is at least four or five years of primary education. A crude index of minimum literacy, as defined for census purposes, does not therefore provide satisfactory information of the actual educational attainment of the population.

14. Of greater use are data on illiteracy. In many countries progress in the reduction of illiteracy has been slow, owing to the lack of sufficient means to provide educational opportunities for the entire population, especially where population is increasing more rapidly than educational facilities. Specifically there is need to compile statistics on illiteracy for:

a. measuring the extent of illiteracy in the country as a whole, and in the different parts of the country;
b. comparing the illiteracy rates among men and women, and among different population groups;

c. finding out the number and proportion of illiterates in different age groups;
d. to compare the present situation with the past, noting the amount and rate of progress in reducing adult illiteracy;
e. to provide a basis for measuring further progress in this respect, especially when there are definite plans for extending school education, and special compaigns for reducing adult illiteracy;
f. to help in the formulation of educational policy, including the planning of illiteracy campaigns, fundamental education programmes, etc.

15. The successful operation of a nation's economy requires an adequate supply of skills and intelligence, and the technological potential can be realized only if the labour supply in kind and number is adapted to labour requirements. The general trend is towards an increase in the proportion of skilled occupations requiring longer and broader education. In a great number of countries, however, the educational attainment of the population has not changed considerably, and large segments fall into the category of functional illiterates. The level of education of the population, 15 years of age and over, in Latin America may be expressed by a median of less than one year of schooling, as against a median of 10.3 in the United States (1952) and 8.2 for Canada (1951). The situation prevailing in Asia is similar to that of Latin America. Consequently, in the countries of these regions, the problem of increasing the educational level of the population is of primary interest and concern.

16. Data on the educational attainment of the population are needed:

a. to measure the educational level of the total population of the country as well as its subdivisions and to determine its functional literacy;
b. to compare the level of educational attainment of men and women and of different population groups;
c. to compare the educational attainment of different age groups, by sex;
d. to analyse the educational attainment of the labour force;
e. to compare the present situation with the past, noting the changes in the effectiveness of the school system;
f. to provide a basis for measuring further progress;
g. to help in the formulation, planning and reformation of educational programmes.

17. Occupational Statistics as an Aid to Planning Educational Programmes. A better use of human resources is a prerequisite for accelerated social and economic progress. One of the primary functions of the educational system is to

provide the basis for an effective utilization of human resources. The occupational characteristics of the labour force reflect to a considerable extent the past and present status of the educational system, as well as the needs of the economy for educated manpower. Thus the problem of developing an adequate labour force, which involves the training of technical and administrative personnel for all branches of economic activity as well as a general increase in the average educational level of the population, is largely a matter of developing an effective educational programme. For this purpose the planning and execution of educational programmes must be based upon factual knowledge of the supply and demand for different kinds of labour. Such factual knowledge will include the size and characteristics of the existing labour supply and the occupational and industrial trends that are likely to affect the supply of and demand for various types of workers in the future.

18. Labour force data are required for planning educational policy, in order to:

a. provide a general picture of the availability of different kinds of professionals and technicians;
b. provide data on the supply of professional, technical, and kindred workers by specialty, including teachers, for the immediate needs of the educational system;
c. compare the national occupation structure with the occupational structure of other countries at different stages of development;
d. compare data on the occupational structure with the requirements of economic development programmes and actual supply provided by the educational system;
e. assess the shortcomings of the professional and technical training of the population by cross-classifying the respective occupations by educational attainment;
f. compare the present situation with the past in order to evaluate the effectiveness of the educational system;
g. formulate and execute educational programmes, particularly at the vocational and university levels, in accordance with the probable future demand for trained personnel.

United Nations Economic Commission for Africa
REPORT ON THE WORKSHOP OF COMMUNITY DEVELOPMENT
Report on the Workshop on Planning and Administration of National Programmes of Community Development, Addis Ababa, Ethiopia, 14-25 September, 1959. Mimeographed. 25 pages.
711.58 (6)

1. This was the first workshop in community development organized by the Economic Commission for Africa. The workshop was attended by 33 representatives sent by 12 member states and 3 associate members; 7 representatives of the United Nations and specialized agencies cooperating in the community development programme, 9 United Nations and specialized agencies experts assisting African countries in community development and fundamental education programmes, 14 observers from international and national organizations, and experts working in Ethiopia.

2. The major objectives of the Workshop were:

a. To provide an opportunity for exchange of experience between governments which are planning or initiating national community development programmes.

b. To formulate for the Members and Associate Members of the Commission recommendations concerning the various aspects involved in planning and administering national programmes of community development.

c. To develop general suggestions for the Executive Secretary concerning the future work of the Economic Commission for Africa in the field of community development.

3. A summary of all discussions and conclusions will not be covered by EKISTICS. These were concerned with the topics of:

a. Concept of community development
b. Planning and organization of national community development programmes
c. Administration and coordination
d. Recruitment and training of staff
e. Financing of community development programmes
f. Approach and techniques at the project level
g. Regional cooperation and international assistance.

Instead EKISTICS presents in detail the summary of the recommendations of this first workshop, which marks the beginning of a coordinated effort of community development activity throughout Africa.

4. Planning and organization of national community development programmes. Considering the important part which community development can and should play in the economic and social progress of African countries, by combining the conscious and voluntary efforts of the people with the action of governments, and also noting the interdependence of the general development of a country and of community development; the Workshop recommends:

a. That national programmes of community development be co-ordinated as closely as possible with general development programmes, by bringing representatives of government and people together at various levels, due regard being paid both to financial possibilities and to the wishes of the people;

b. That the selection of a suitable structure for community development, whether a special agency or an inter-departmental programme, should depend upon the existing administrative and financial situation;

c. That, whatever the approach adopted the closest attention be paid to the matter of co-ordination, without which community development cannot be effectively carried out.

5. Recruitment and training of personnel. The recommendations include that distinction be made of each level of personnel. However, at each level, from the highest to the lowest it is important that care be taken in both the selection and the training of the personnel.

6. Financing of community development programmes. This is extremely important to be able to carry out any projects and demands that there both be increased contributions from the governments and that the operation is made more efficient through the use of existing organizations and administrative facilities.

7. Approach and techniques at the project level. The participants in the workshop, having studied the approaches and techniques of community development, recommend that:

a. The role of the central government representative in community development at the various levels be primarily one of co-ordination;

MOROCCO
ALGERIA
LIBYA
EGYPT
FRENCH WEST AFRICA
EQUATORIAL AFRICA
SUDAN
NIGERIA
UGANDA
ETHIOPIA
GUINEA
GHANA
LIBERIA
FRENCH
BELGIAN CONGO
KENYA
SOMALILAND
TANGANYIKA
ANGOLA
Mufulira
MOZAMBIQUE
Salisbury
SOUTH WEST AFRICA
AFRICA
UNION OF SOUTH AFRICA
FEDERATION OF RHODESIA & NYASALAND
0
500
MILES

b. Close co-operation be maintained between all those participating in community development activities; special attention being given to the contribution of the rural teacher both in and outside the school.

c. Special efforts be made to establish confidence and lasting co-operation between community development workers and the people, bearing in mind that the success of such co-operation depends on a number of factors, including a knowledge of the environment, of local traditions and of psychological factors; as well as ability to discover the natural leaders and to establish institutions through which the people can express their needs and wishes;

d. Community development projects be methodically planned and carried out - the practical process comprising successive co-ordinated stages (surveys, studies, field experiments, extension work, planning, execution and appraisal of results), the timing being such as to avoid any risk of losing the impetus of popular enthusiasm;

e. These activities in the field be sustained by the necessary supporting services (training, provision and maintenance of material and equipment);

f. Wherever possible, voluntary organizations likely to be of assistance should be invited to co-operate in community development projects;

g. Women be called upon to take an increasing part in community development activities in view of their economic and social influence, and that such participation be encouraged by giving them a social education comparable to that provided for men, by selecting and training women leaders and by developing women's associations;

h. Participation of young people in community development activities fostered by providing school education more closely adapted to local requirements and by provision of out-of-school activities in which youth can find outlets for its energy and enthusiasm in community development projects.

i. Traditional cultures be used as a basis on which to build a modern society in so far as they are not opposed to progress.

j. Co-operative organizations be recognized as important factors in raising the economic and social conditions of the people. Action by governments in this field should aim at encouraging co-operative activities, establishing co-operative departments, enacting appropriate laws, providing the

co-operative movement with technical advice and fiscal privileges and making use of the technical assistance in this field.

8. Regional co-operation and international assistance. Having considered the possible benefits arising out of regional co-operation in the field of community development and the need for increased technical assistance, it is recommended that:

a. The Economic Commission for Africa should provide assistance to African countries in training administrators and technicians charged with the planning and direction of community development policies. This can be best achieved by organizing training courses in various regions or sub-regions of Africa for a limited number of countries. These should provide both theoretical and practical training, include the study of field experiments and in general be of longer duration than ordinary seminars of workshops.

b. The Economic Commission for Africa should engage in collecting and distribution documentation on methods and techniques of community development being evolved primarily in Africa and on experiments being carried out in other parts of the world. These activities may gradually lead to the publication of a bulletin on community development. ECA should also undertake to build up a film library on community development and related subjects and to organize a lending service for Africa.

c. A comprehensive study of community development in Africa should be carried out by ECA periodically and, in addition, special studies should be undertaken on various aspects of community development in Africa which may contribute to a solution of practical problems;

d. ECA should help the African countries to recruit experts on community development, to orient them to local requirements and to facilitate contacts between experts provided by different organizations.

e. ECA should not only play a more important role in organizing study tours on community development within and outside Africa but also act as a clearing house for exchange visits on community development administrators.

f. The Workshop expressed the view that technical assistance for community development should not only include the provision of experts and fellowships, but also equipment for demonstration and training centres and audio-visual material;

g. The Executive Secretary may suggest for the consideration of ECA at its next session, the establishment of a committee on community development to be called concurrently with the session of ECA for the purpose of assessing progress and working out an ECA programme in this field for the following years.

Crist, Raymond E.
BOLIVIA IN REVIEW
Focus, Vol. X, No. 4, December, 1959. 6 Pages. Illustrations.
(84)

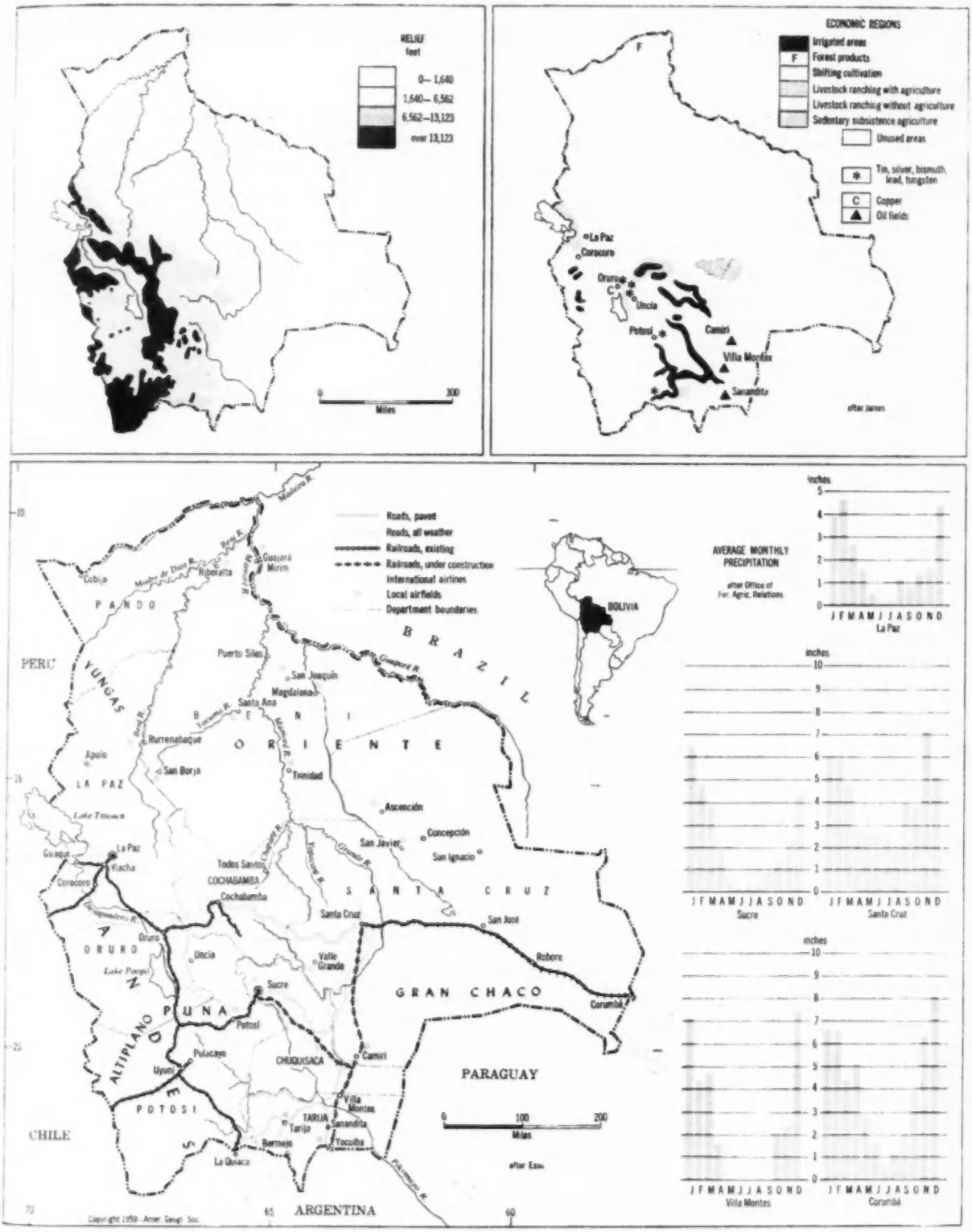
1. Dr. Crist, research professor of geography, University of Florida, Gainesville, has carried out field investigations in Bolivia under the auspices of the John Simon Guggenheim Memorial Foundation. He presents an interesting review of the problems and potentials of one of the world's developing countries.

2. La Paz. The capital and chief commercial center of this strife-torn republic has, curiously, the name "Peace." It was thus christened in 1550 when an uprising of local Indians had been successfully put down. During both the colonial and republican regimes it has been the scene of a series of revolts and revolutions, sometimes two or more in a single year; yet in spite of all this, the population has increased. It more than doubled between 1928 and 1950, and has now reached 321,000, one-tenth of the nation's total, and will probably continue to grow at about the same rate. A steady stream of migrants flows to work as servants, and in the two cotton and two woolen mills, and the ten weaving and knitting factories that are the country's principal manufacturing establishments.

3. Mineral Wealth. Much of the southern part of the Altiplano is a barren saline waste, outside of the Potosi area. (See Map, p. 49) Here there are rich deposits of silver. There are many other mines on the Altiplano, producing copper, zinc, bismuth, tungsten, antimony, and wolfram, but in recent years the enormously rich tin deposits have overshadowed all else. Bolivia is the world's third largest tin producer, and tin provides nearly 60 per cent of the total export revenue (minerals provide in all 94 percent of it and pay for the imported foods and manufactured goods).

4. Nationalizing the tin industry and revamping the land tenure system did not result in the wealth for the people hoped for by the government. It then, unfortunately, began printing money to pay the miners. Mine commissaries provided miners with essentials at subsidized prices and the country was soon in the grip of inflation. A $25 million currency stabilization loan was granted by International sources, and at the same time a group of mining experts representing both government and labor recommended that $8 million be spent to modernize the tin industry. The present problem is how to do this, make the tin mines pay, and keep peace among the various contending factions in the population.

5. Transportation Problems. Bolivia has long suffered from deplorable communications between the infertile Altiplano, where are most of the people and cities, and the fertile but mostly empty and undeveloped Oriente, the broad lowlands east of the




Maps drawn by Vincent Kotschar

Andes. This has meant, for one thing, regional isolation and a lack of national consciousness.

6. To help solve the problem, the government negotiated a loan from the Export-Import Bank for completion of the highway from Cochabamba to Santa Cruz that had been under construction for generations. At the same time connections with Brazil and Argentina are being improved. Being landlocked, Bolivia must export its minerals via transportation facilities than run through foreign countries. This situation encourages imports from abroad (chiefly of sugar, wheat, flour, rice, cattle, cotton, coal, iron and steel products, mining machinery, vehicles and textiles) and discourages home production. In 1956, however, the government discontinued its subsidies on imported food and the Indians began to bring more land under cultivation in response to better prices.

7. The Oriente. These lowlands cover 70 per cent of Bolivia's total area, and as noted, are nearly empty. The climate is tropical and they get plenty of rain. They should be able to support hundreds of thousands of people at a high standard of living. So far, the history of their colonization has been a sad one, largely because attempts were made to populate remote areas without regard to possible markets.

CURRENT WORK OF DOXIADIS ASSOCIATES

# THE SIZE AND SHAPE OF URBAN PLOTS

Prepared in 1959 for the Government of the Republic of the Sudan

Ministry of Local Government

1. In many cities of the world satellite villages have been created outside the Municipalities. These settlements are inhabited by people who came to the towns from the rural areas but who could not afford a plot inside the Municipal boundaries. This is a common phenomenon all over the world and is mainly due to an unrealistic approach in setting up the regulations governing planning and building, particularly in the definition of a minimum plot size.

2. The result of this situation is that people build their own houses near the town where they live and work, but outside the control of the Municipal Authorities. Many of these people are forced to turn to this solution because the requirements of the regulations are beyond their economic means.

3. An example is New Delhi, India, where one-third of the inhabitants live outside the town boundaries because of the regulations imposed.

4. As soon as people settle near the towns they proceed in building their "shelter" using the most primitive building materials such as paper, string, tins and mud. Their settlement becomes day by day more permanent and very soon the inhabitants ask the Municipal Authorities for their inclusion inside the Municipal boundaries and the provision of water and electricity as well as the construction and maintenance of roads.

5. Both these problems, namely the over expansion of the town and the creation of uncontrolled "willages" are mainly caused by the large size of the regulation urban residential plots.

6. Countries now being developed have, in most cases, a tendency to imitate other more advanced countries and to accept regulations in force in the latter, although these regulations were often imposed for quite different conditions of living from those of today and are often already long out of date.

7. The residential plot is the surface unit which mainly determines the degree of expansion of a town. The net area of the residential plots usually occupies about a quarter, while the gross residential area covers about the half of the total area of a town.

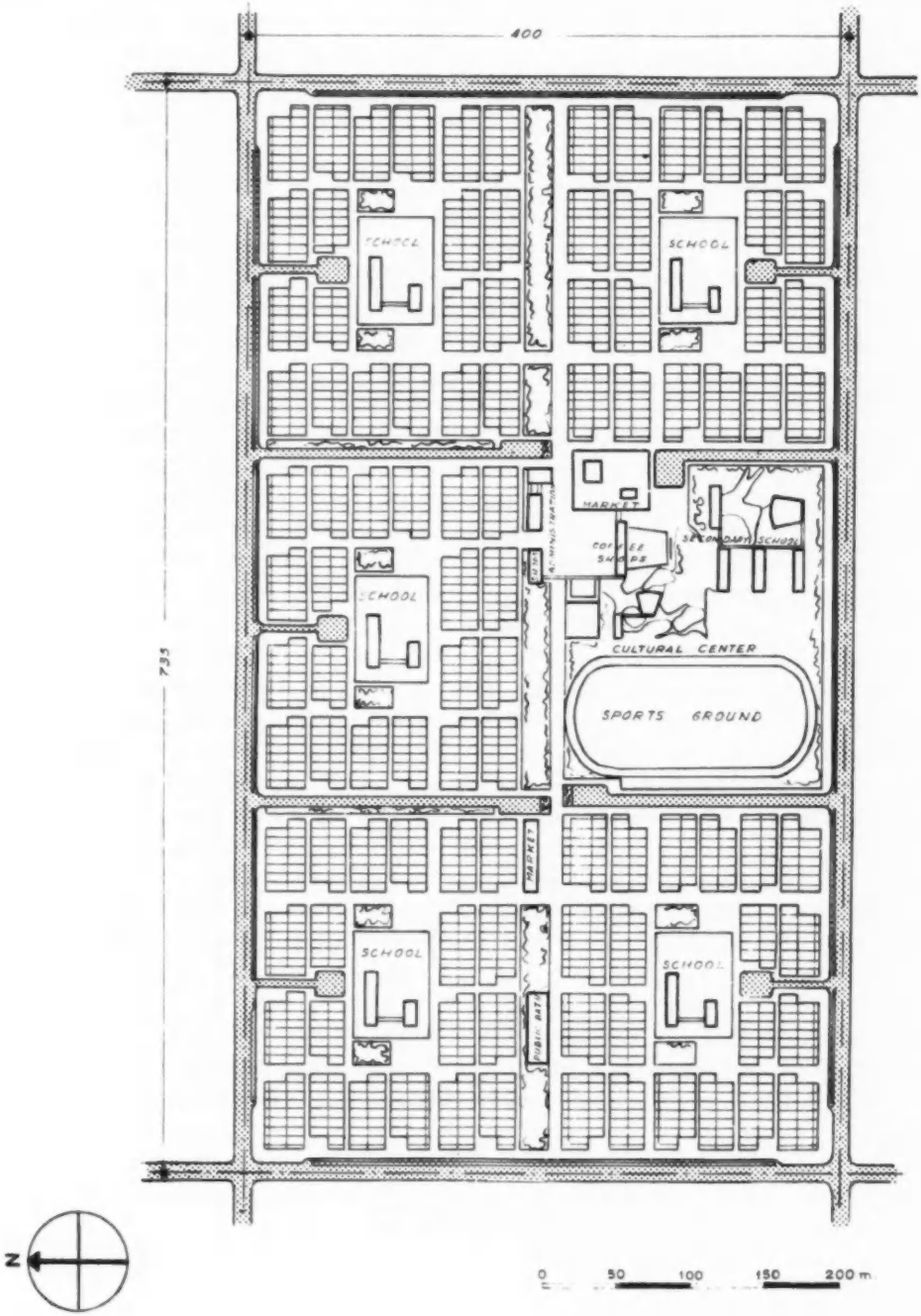
8. It is obvious, therefore, that the "plot" is a very important element in the design of any human settlement for it is connected with:

   a. The degree of expansion and consequently the urban economics of the town.

   b. The type and size of the houses, the focus of the family life.

# CONVENTIONAL COMMUNITY CLASS IV

## STUDIED FOR VARIABLE DIMENSIONS OF PLOTS



9. A part from the size of urban plots, urban economics of the town are influenced by their shape, in particular the ratio of the plot frontage to its depth.

10. Indeed, although the design of a community is based on many factors, the most important of those, from the viewpoint of urban economics, is the size and shape of its urban plots. This affects the total cost of the community development in the following fields:

a. Cost of land.
b. Cost of construction and maintenace of roads.
c. Cost of additional building work such as increased length of fence walls and of internal lines of water supply, electricity and sewerage.
d. Cost of installation, operation and maintenance of community facilities such as water supply, sewerage, electricity, telephones, etc.
e. Cost of community services such as post, police, garbage collection, night service, etc.
f. Cost of transportation of the inhabitants and goods.

11. The object of this report is to cover the significance of two factors: the size and shape of residential plots, to the development of a town; to prepare the way for a revision of existing regulations.

12. In order to establish a basis for the comparison of plot sizes and types and to study the variations in total costs resulting from increases in size a typical Class IV community was taken as a study model. This community contained 1500 plots and covered an area of 735m x 400m, to the center line of the surrounding highways. These highways are 28.50m wide, while the internal roads are 5.00m and 7.00m and the pedestrian ways 3.00m, 6.00m and 9.00m.

In the study it first was assumed that all plot frontages (running E-W) were increased from 1-12 meters, while all other aspects of the community remained unchanged. Next it was assumed that the same plots increased in depth (N-S direction) from 1-12 meters. Finally that both sides of each plot was increased equally and simultaneously.

13. All costs were based initially upon those pertaining in Pakistan, but in order that the study could have more general application, the increase in each item of cost (roads, facilities, etc.) has been computed as a percentage increase over the initial costs.

14. The first diagram shows the increase in the initial cost of the plot as it is increased in size along the frontage at both sides and in depth.

15. The next two diagrams show the increase in the costs of building works and road construction as the size of the plot is increased. The increased cost of building works--such as pipelines, fences, walls, pathways, etc.--is relatively small, rising to 24% of the initial building cost in the case of a 12m extension of the plot on both sides.

16. The increased cost of road construction is proportionately far greater especially with an increase in the width of the plot. Indeed when the frontage width is increased by 12m road construction costs rise by 98%, though when the depth of the plot is increased by 12m construction costs rise by less than half as much (46%).

17. Further diagrams show the increases in costs of community facilities such as water supply, sewerage and electricity as the sizes of plots are increased. As in the case of road construction costs, the proportionate increase is far greater with an increase in the frontage than with an increase in depth.

18. A final diagram shows the relative increase in cost of each item as a percentage of the total increase in cost of land development, from which it can be noted that the relative increase in road costs exceeds all others except that of the increase in land value of the plot.

19. It can also be noted that in every case an increase in the frontage causes a much greater increase in costs than an increase in plot depth.

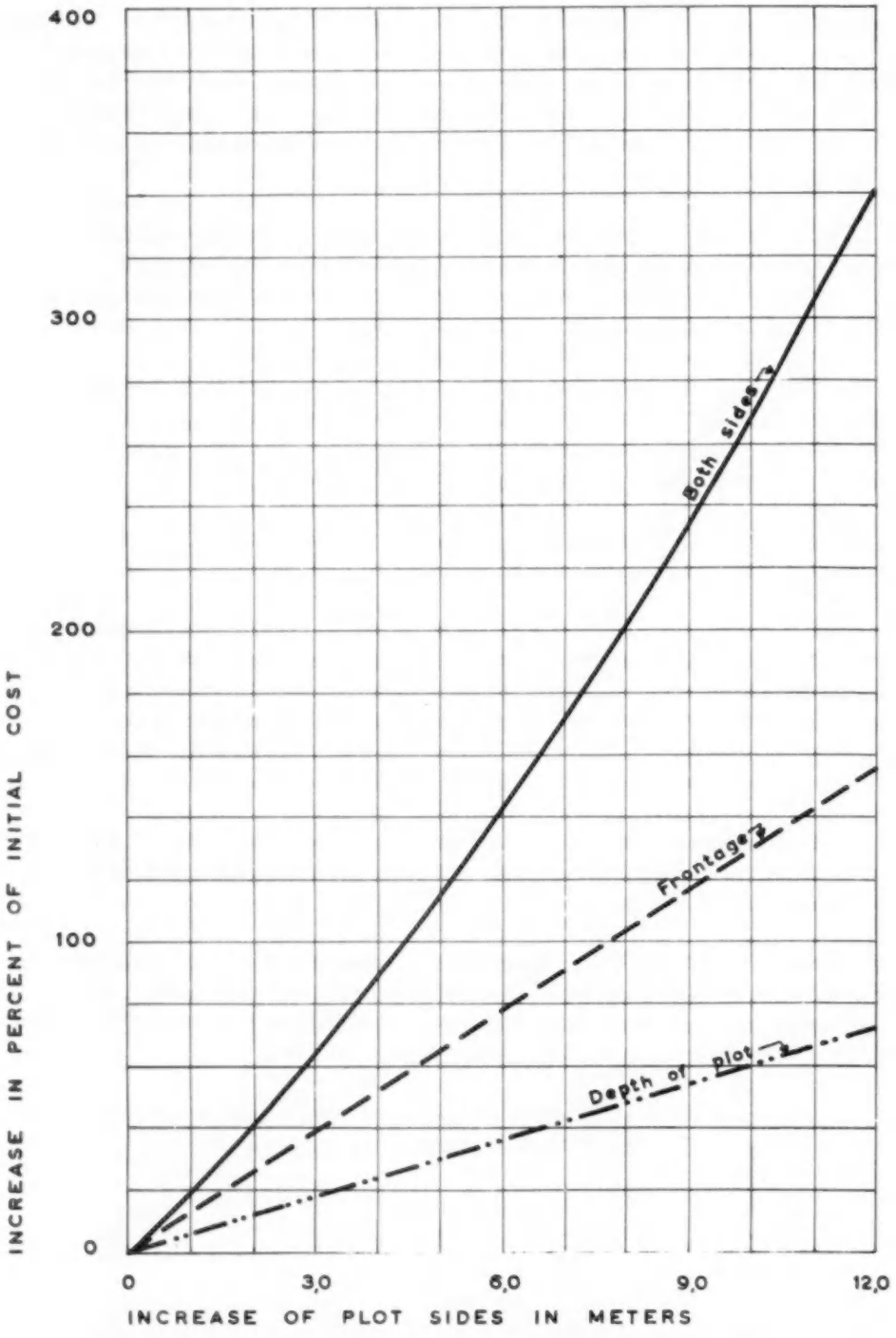
20. The costs of such community services as police, post and telephones, garbage collection, transportation of people and goods are not included in this set of diagrams. Such an estimate requires a special study including the overall area occupied by the town itself. It can, however, be stated from experience that the sizes and shapes of urban plots have a considerable effect upon their cost and efficiency.

21. The influence of climate upon human health and comfort is not dependent upon the size and shape of the plot, but upon its orientation, together with the placing and design of the dwelling.

22. Sunlight is a powerful bacteriological agent, and is necessary for the proper growth of children and the creation of psychological well being. On the other hand, an important problem in warm countries is the control of the penetration of direct sunlight during the hot season.

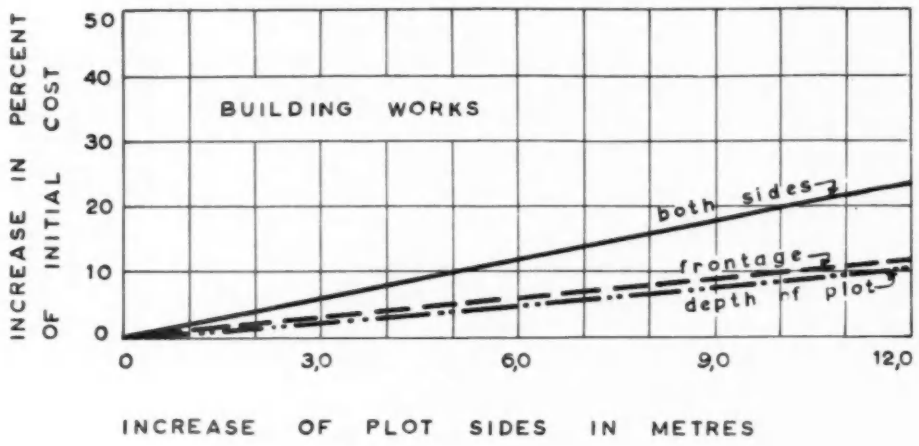
# ANALYSIS OF A CONVENTIONAL COMMUNITY CLASS IV

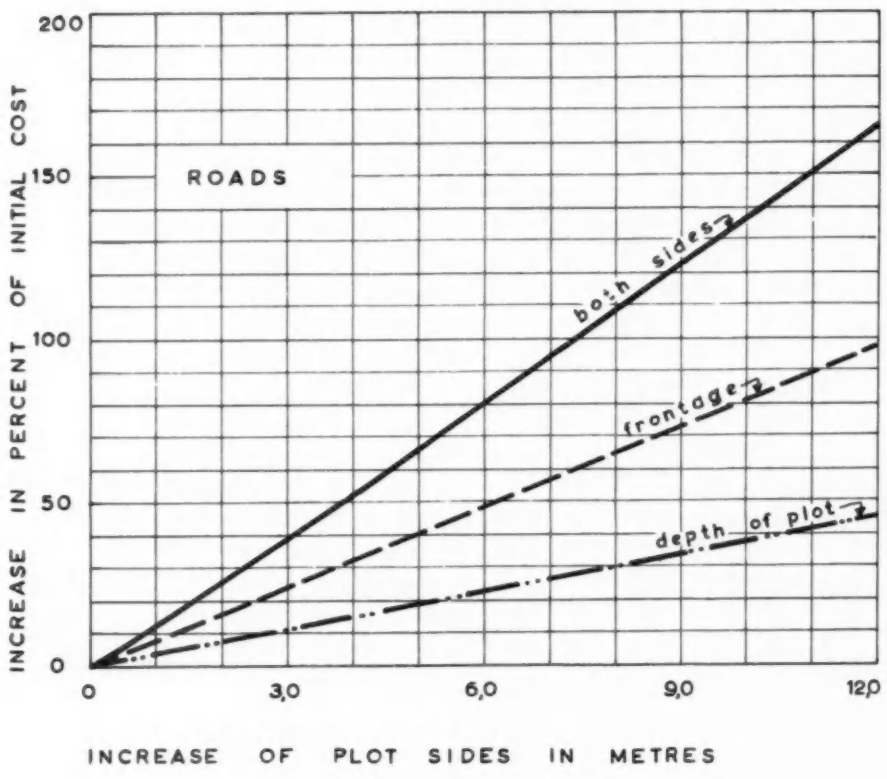
INCREASE IN COST OF PLOT VALUE
vs. INCREASE OF PLOT SIDES



# ANALYSIS OF A CONVENTIONAL COMMUNITY CLASS IV

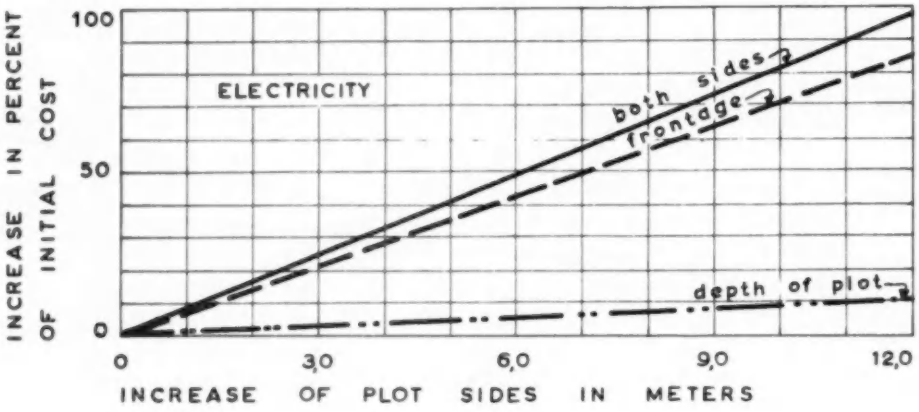
INCREASE IN COST OF BUILDING WORKS AND ROADS
vs. INCREASE OF PLOT SIDES

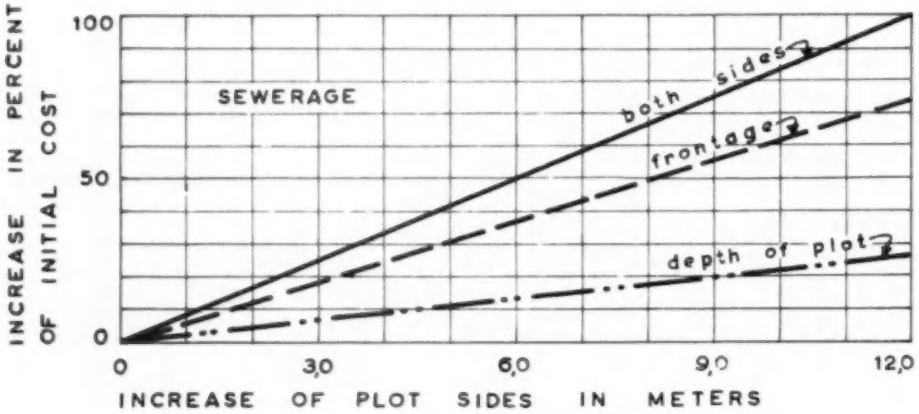


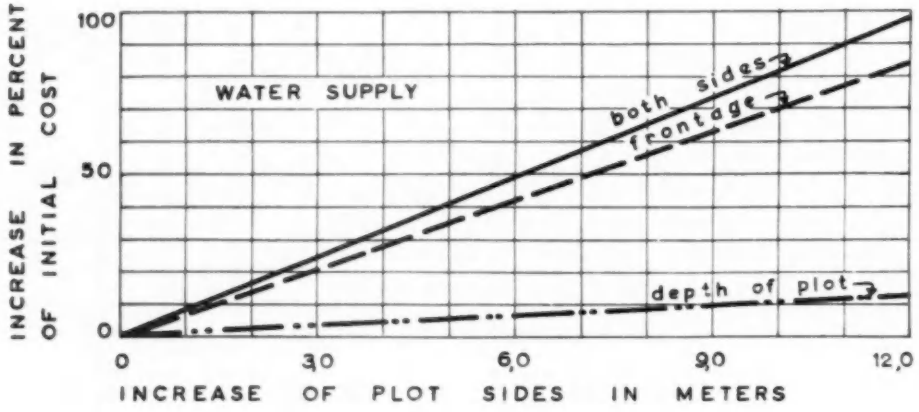



# ANALYSIS OF A CONVENTIONAL COMMUNITY CLASS IV

INCREASE IN COST OF COMMUNITY FACILITIES
vs. INCREASE OF PLOT SIDES

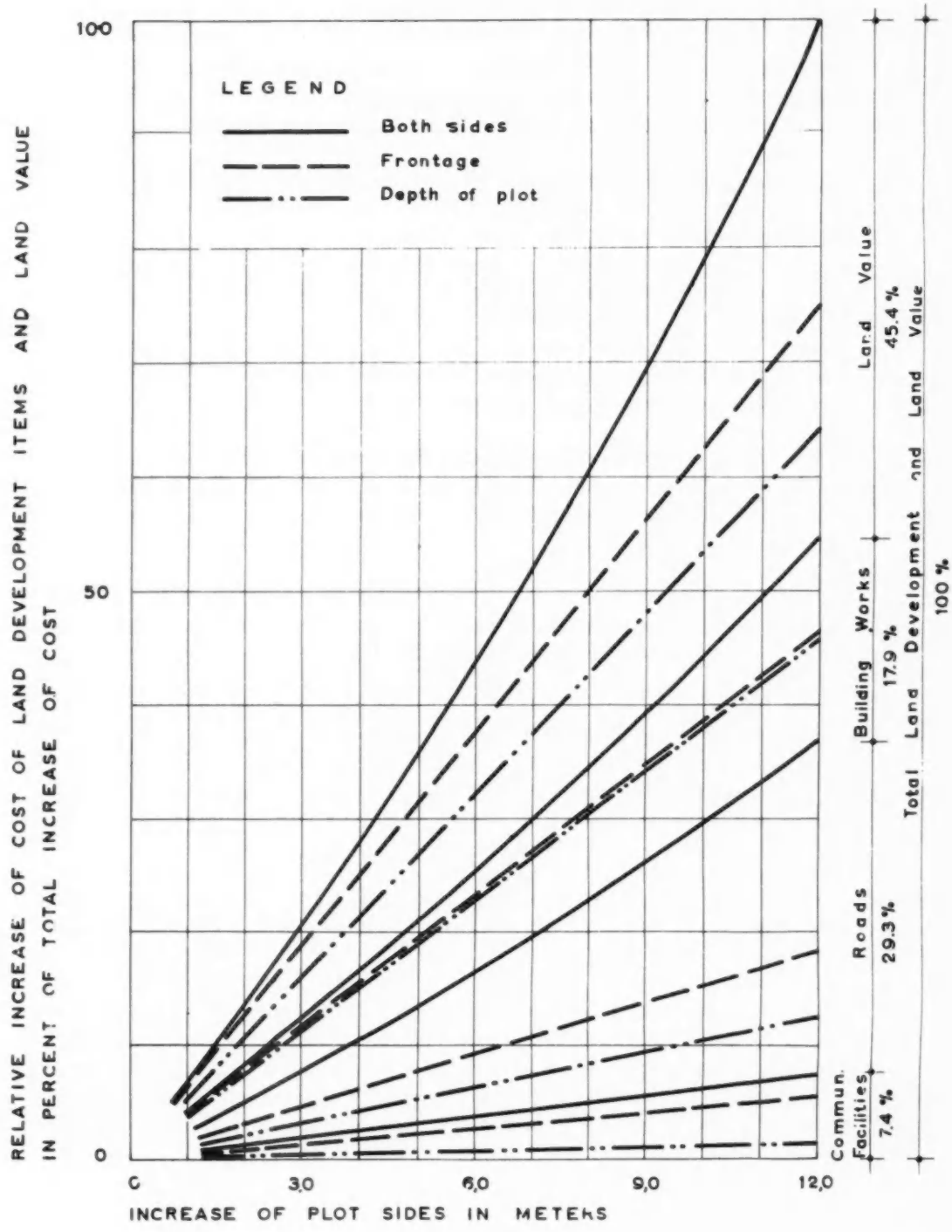


# ANALYSIS OF A CONVENTIONAL COMMUNITY CLASS IV

RELATIVE INCREASE OF COST OF LAND DEVELOPMENT ITEMS
vs. INCREASE OF PLOT SIDES



23. Large plots, unless copiously planted, cannot easily be protected from direct sunlight. Solar heat absorbed and radiated from the ground paved courtyards, walls and fences increases the discomfort of the inhabitants.

24. An important factor for the creation of better living conditions in every house is cross ventilation. This factor does not depend on the size of the plot. The main principles for cross ventilation are based on the following requirements:

a. Proper location and orientation of the house within the plot.

b. Proper design of the plan of the house.

c. Proper provision for ventilation means, i.e., ventilation openings, different heights of rooms, etc.

25. In addition to this, it is known that a narrow space, especially if shaded, can serve as a better conductor of a passing breeze than a large sunburnt area.

26. If the plot is not wide enough to allow for designing all the main rooms perpendicular to the direction of the prevailing wind, cross ventilation may be ensured by the proper design of the house, either by creating internal courtyards and/or by providing different height ceilings.

27. Privacy is undoubtedly desirable within the private domain. A fundamental requirement, therefore, irrespective of income group, is that each house should be designed to be independent and complete in itself.

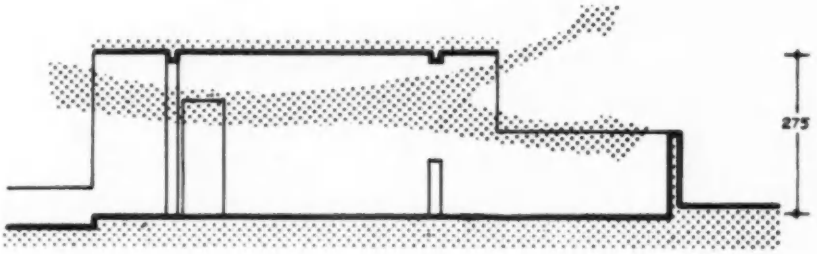
28. This is as well achieved by proper design upon a small plot than by the possession of a large unorganized plot. In warm countries outdoor space is used for many of the functions of everyday life. This outdoor space may be considered an extension of the building itself and consequently a necessary element for the proper functioning of the household.

29. The elongated plot provides the possibility of creating two compact courtyards front and back of the house instead of split-up areas all around it. This arrangement can provide better accommodation for the functions performed in these outdoor areas.

30. House type B02, designed for Pakistan, is for a low income group. The total plot measures 7.30m x 14.60m (106 sq.m.). There is a front yard through which visitors may easily enter the guestroom, and a backyard which may be used as a garden. The unroofed area between the utility core along the road and the second room of the house may be covered over with straw mats which would not impede cross ventilation.

# VENTILATION

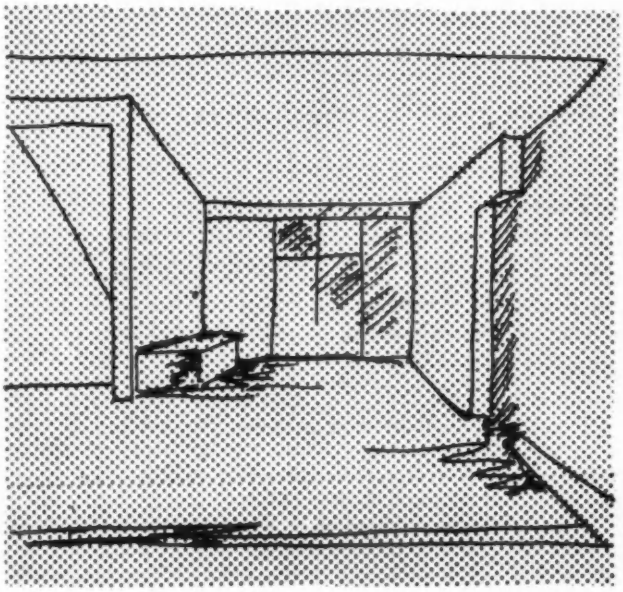
## CROSS VENTILATION TO BE OBTAINED BY APPROPRIATE HOUSE DESIGN

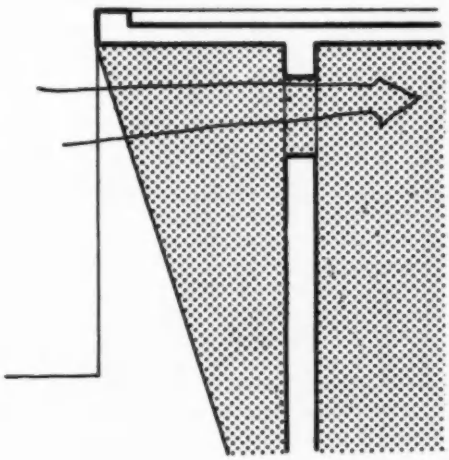



High enough to allow operation of artificial ventilators

Ventilation opening

A cross current in living areas and at man's height





Openings high under the ceiling

Air passes through shade and not heated surfaces

31. House type C03 is a three-room house on a plot 10.95 x 14.60m (160 sq. in.) designed for a higher income family. In this layout the utilities have been removed to the rear of the house. The front garden leads to the guest room and the vernadah. A timber screen separates the guest room and the front garden from the living area of the house. Cross ventilation takes place through the shaded verandah; most of the walls are protected from the sun rays.

32. It has been shown that variations in the size and shape of urban plots have a considerable effect upon urban economics, but that the amenity and comfort of the inhabitants depend mainly upon the design and orientation of their dwelling and upon the general planning of the community.

33. The organization of plot types can thus be based upon the following general principles:

a. To relate the cost of the total project to the incomes of the families.

b. To find the desirable relation between cost of land, costs of land development and house construction.

c. As a result, to design plot types for each income group.

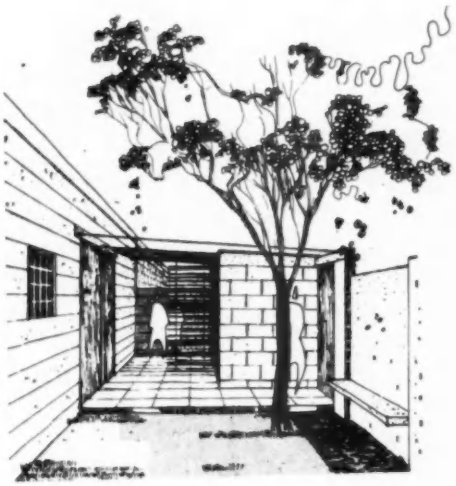
34. Fundamental principles to be followed in deciding upon plot types are:

a. A basic module for both dimensions of the plot should be accepted.

b. Plot sizes assigned to each income group should vary from a minimum to a maximum to allow for variations in family need.

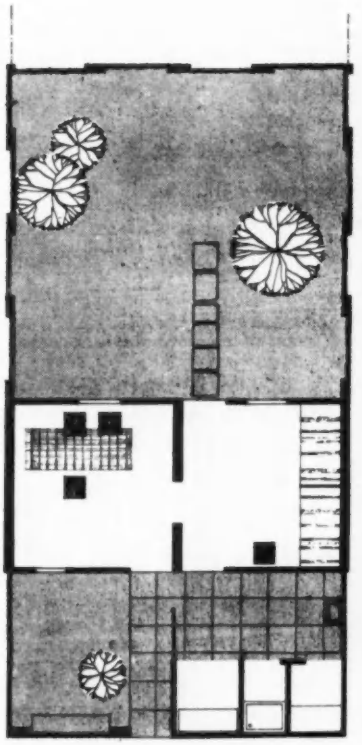
35. The relation of the cost of the total project to family incomes is a very important consideration for the satisfactory realization of any housing project. The classification of a population in several main income groups must vary from place to place and country to country. Also the determination of a reasonable ratio between the cost of dwelling and total income is something which differs greatly even within one income group according to the profession and size of family. Special studies are therefore necessary in every case.

# HOUSE TYPE B 02



VIEW FROM THE FRONT YARD

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | HOUSE TYPE B 02 | | | | | |
| 2 | PLOT | Area sq. ft. | | Frontage ft | | Depth ft |
| | | 1152 | | 24 | | 48 |
| 3 | BUILT UP AREA | Total Area sq. ft. | Main Structure sq. ft. | Service sq. ft. | Shelter sq. ft. | |
| | | 370 | 296 | 74 | — | |
| 4 | VOLUMES | Total Volume cu. ft. | Main Structure cu. ft. | Service cu. ft | Shelter 50% of Actual Volume cu. ft. | |
| | | 3688 | 3108 | 580 | — | |
| 5 | COST | Total Rs. | | Rs. per cu. ft. | Rs. per sq. ft | |
| | | 1738.00 | | 0.47 | 4.69 | |
| 6 | ARCHITECTURAL PROGRAM | a | 2 Rooms | | | |
| | | b | 1 Kitchen | | | |
| | | c | 1 Shower | | | |
| | | d | 1 W.C. | | | |



PLAN

## TABLE II

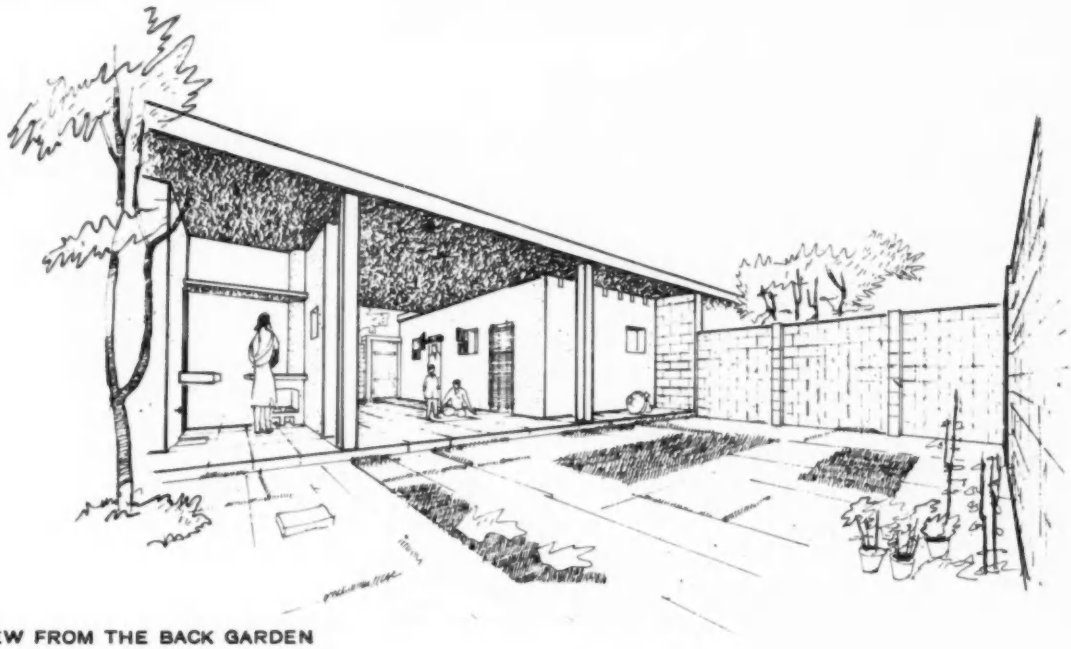
## RELATION OF PLOT SIZE TO INCOME GROUPS

| Income Groups* | Minimum and maximum dimensions of plots | | | |
|---|---|---|---|---|
| | Sudan | Iraq | Lebanon | Pakistan** |
| Lowest | 9x12<br>9x15<br>108-135 sq.m. | 6x12<br>9x21<br>72-189 sq.m. | 6x15<br><br>90 sq.m. | 7.30x10.95<br>7.30x14.60<br>80-107 sq.m. |
| Lower Middle | 9x15<br>12x21<br>135-252 sq.m. | 9x12<br>9x24<br>108-216 sq.m. | 6x15<br>9x15<br>108-135 sq.m. | 7.30x14.60<br>10.95x18.25<br>107-200 sq.m. |
| Higher Middle | 15x21<br>18x33<br>315-594 sq.m. | 9x18<br>12x24<br>162-288 sq.m. | <br>9x21<br>189 sq.m. | 10.95x18.25<br>14.60x18.25<br>200-266 sq.m. |
| Highest | <br><br>594 and over | 15x24<br>18x36<br>360-648 sq.m. | <br>-<br> | 14.60x21.90<br>and over<br>320-1250 sq.m. |

* The average income corresponding to each group varies in each country. Consequently this table has only comparative value.

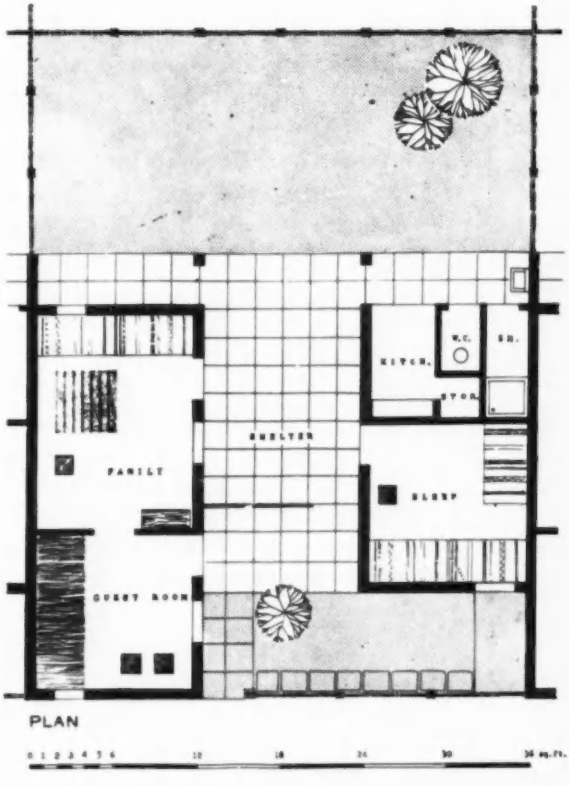
** Dimensions converted from the British metric system.

# HOUSE TYPE C O3



VIEW FROM THE BACK GARDEN

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | HOUSE TYPE | C O3 | | | | |
| 2 | PLOT | Area sq. ft. | | Frontage ft. | | Depth ft. |
| | | 1728 | | 36 | | 48 |
| 3 | BUILT-UP AREA | Total Area sq. ft. | Main Structure sq. ft. | | Service sq. ft. | Shelter sq. ft. |
| | | 967 | 598 | | — | 369 |
| 4 | VOLUMES | Total Volume cu. ft. | Main Structure cu. ft. | | Service cu. ft. | Shelter 50% of Actual Volume cu. ft. |
| | | 8216 | 6279 | | — | 1937 |
| 5 | COST | Total Rs. | Rs. per cu. ft. | | | Rs. per sq. ft. |
| | | 4392.00 | 0.53 | | | 4.54 |
| 6 | ARCHITECTURAL PROGRAM | a | 3 Rooms | | | |
| | | b | 1 Kitchen | | | |
| | | c | 1 WC | | | |
| | | d | 1 Shower | | | |
| | | e | 1 Storage | | | |
| | | f | Schelter | | | |

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